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PART I

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INTRODUCTION

More than 15 years ago the author initiated field studies of the flora of the British West Indian Island of Dominica. Certain aspects of this work have already been reported upon, but because of World War II the preparation and publication of the main body of the flora was interrupted and has been delayed until now. The first part of this work is contained in the present publication. It embodies a general ecological account including descriptions of the principal plant communities of Dominica, and an annotated catalogue of the native pteridophytes, gymnosperms, and monocotyledons. The second part of this flora is in preparation and will conclude the catalogue of vascular plants with an account of the dicotyledons.

The author wishes to express his appreciation to the many who have aided in the successful prosecution of this work.

To the late Professor Merritt Lyndon Fernald of the Gray Herbarium of Harvard University I am especially indebted, for it was under his mentorship during the years 1938 to 1941 that this study was begun. To him, too, I owe thanks for partial support of field exploration, which was also aided in 1940 through the award of a Parker Fellowship by the University.

While at Harvard I also was privileged to receive sympathetic assistance from many associates especially at the Gray Herbarium, the Botanical Museum, the Arnold Arboretum, as well as at other institutions. For aid with specific groups I owe special thanks to several individuals:—to the late Mr. Charles Alfred Weatherby (ferns), to the late Mr. William R. Maxon (ferns), to Mr. Conrad V. Morton (ferns), to Dr. Lyman Bradford Smith (bromeliads), and to Drs. Donovan S. Correll and Louis O. Williams (orchids).

Local travel and field work in Dominica in 1937, 1938, and 1940 would have been impossible without the numerous courtesies and ready hospitality extended by local residents and friends. Grateful thanks for generous hospitality are due Mr. and Mrs. John E. Knowlton of Sylvania, Mrs. Marion Surbrook of Roseau, Mr. Clem Dupigny of Ridgefield, Mr. Clarence Henderson of South Chiltern, Mr. Howell Shillingford of Milton and Hatton Garden, and Mrs. Elma Napier of Pointe Baptiste.

I am indebted to Dr. Paul C. Mangelsdorf, Director of the Botanical Museum of Harvard University, for permission to use the fine drawings of orchids. With a single exception these are from the recent publication, "Orchids of Guatemala," by Oakes Ames and Donovan Stewart Correll; the illustration of *Malaxis spicata* first appeared in Dr. Correll's, "Native Orchids of North America." Illustrations of grasses are from "Manual of the Grasses of the West Indies," by the late A. S. Hitchcock. The map of the Lesser Antilles is taken from "The natural vegetation of the Windward and Leeward Islands," by Dr. J. S. Beard, by whose courtesy it is reproduced. Detailed maps of Dominica have been skillfully adapted and drawn as a generous contribution by Miss Mignon Dean Holmead of Silver Spring, Maryland. All photographs included have been taken by the writer.

In conclusion I wish to express my appreciation to my wife, Barbara Taylor Hodge, for her assistance throughout the preparation of this

work and especially for her competent aid and companionship during many long days in the field.

The publication of this initial part of the Flora of Dominica has been made possible through the generous award of a grant by the National Science Foundation to whom I wish to acknowledge my deep obligation.

FACTORS OF THE ENVIRONMENT

PHYSIOGRAPHY

Dominica, the third largest island in the Lesser Antilles and the largest British island (Trinidad, which is better considered geographically as a fragment of South America, excepted), lies between $15^{\circ}10'$ – $15^{\circ}40'$ north latitude and $61^{\circ}44'$ – $61^{\circ}30'$ west longitude, equidistant between the larger French islands of Guadeloupe and Martinique and about 30 miles from each (Fig. 1). Like the majority of the volcanic Caribbees, Dominica's complex mountainous axis has a north-south trend. The island's maximum length is about 28 miles, the maximum width close to 15 miles with a total area of about 304 square miles. All of this land is very rugged, and precipitous, with numerous peaks (the *mornes* of the patois-speaking inhabitants), many of them rising sheer from the sea. In Morne Diablotin (4,700 ft.) and Morne Trois Pitons (4,600 ft.), the island possesses elevations surpassed by no other Lesser Antillean mountains save for Morne Soufrière on nearby Guadeloupe. Due more than anything else to the lack of any extensive flatland, tropical agriculture has not made as deep inroads as on some of the other islands with the result that the vegetation of Dominica's interior has remained largely untouched.

The main mountain-axis is a north-south one but on the basis of the disposition of its principal peaks Dominica may be divided into three small mountain areas, each somewhat separated from its neighbor by partly connecting west-and east-running river-valleys. On the north, standing alone, is an old volcanic peak, Morne au Diable (2,917 ft.) (Fig. 2), whose northern slopes precipitate into sheer sea-cliffs, 1,000 feet high, and whose southern slopes extend into low ridges which connect those of the highest peak, youthful Morne Diablotin, (Fig. 4), which lies just south of Portsmouth. To the east of Diablotin lie 2 smaller peaks—inaccessible Morne Grand Bois (3,034 ft.) and Morne Concorde (2,106 ft.). Extending south from these three major heights are a series of smaller mornes and ridges which somewhat parallel the coast, forming within their axes a stream-dissected central plateau, lying between 1,500–2,000 feet in altitude, which is drained chiefly by the west-flowing Layou, Dominica's largest river. The Layou, tying in with the headwaters of the east-flowing Pegoua and Castle Bruce rivers, forms the main east-west valley system which separates the northerly peaks from the assembly of peaks to the south. Of the latter mountains Morne Trois Pitons, located midway between the Atlantic and Caribbean shores, is the highest; it is apparently the youngest volcanic cone, regular in shape and with a well-formed crater (Fig. 5). To the south of Trois Pitons lies her sister peak, Morne Micotrin (3,891 ft.) (also known as the Lake Mountain), and then follows a series of mountains which include Morne Watt (4,075 ft.), Morne Anglais (3,748 ft.), and Morne Plat Pays (3,142 ft.). As in the north the southernmost mornes end in high sea-cliffs (Fig. 3).

According to Davis (8), Dominica "is a superb example of an elaborately dissected, composite volcanic island. . ." The dissection of the island is so far advanced as to obscure the number of volcanoes composing the axial range. However it is probably safe to say that Mornes au Diable, Diablotin, Trois Pitons, Micotrin, Watt, and Plat



FIG. 2. The northwest coast of Dominica as seen from Fon Pays with Morne au Diable at the right and Portsmouth Bay and the Cabrits at the left.

FIG. 3. The southwest coast of Dominica as seen from Roseau with Morne Plat Pays at left and Morne La Vue in center.

Pays represent at least fragments of principal volcano-masses. It has been suggested also, and plausibly, that the two small tarns (near Laudat) known as the Boery Lake and the Freshwater Lake occupy old volcanic craters. The Boiling Lake in the Grand Soufrière is hardly in the same class on account of its small size. From observations made from the summit of Morne Watt, John E. Knowlton (of Sylvania, Dominica) suggests that the Boiling Lake perhaps represents simply an area of fumaroles, the outlets of which have been blocked by landslides.

In Dominica deep ravines and youthful valleys, difficult to traverse, radiate from all the principal heights; the valleys separate the numerous spur-ridges which migrate towards the coasts often ending in sea-cliffs. The age of these cliffs (measured by the amount of wave abrasion) is comparable, according to Davis, with the age of the adjoining valleys (measured by the amount of erosion). The sea-cliffs were formed by wave-action during a period in youth when protective fringing reefs had not yet appeared. Fringing reefs have never been extensively formed around Dominica because the constant deluges of mud-flows and outwashed valley-detritus have been so severe that any incipient coral-formation has been smothered. At the present time reefs known to the writer exist in Soufrière Bay on the southwest coast and off Calibishie on the northeast coast. The presence of reefs is easily determinable by the presence of white coral sand; most beaches (or cliff-fronts) around Dominica are composed not of white coral-sands but of a fine black sand resulting from the pulverization of the dark volcanic rocks and boulders.

GEOLOGY

The geological history of Dominica cannot be considered separate from that of the other younger Caribbees which comprise the volcanic island-arc which begins with St. Eustatius in the north and continues to Grenada in the south. A recent summary of the general history of the group is that of Schuchert (45), from whose work the following paragraphs have been largely taken.

The Lesser Antilles may be divided readily into two island series (Fig. 1). With one of these we need not deal—an older, low, northeastern group of once submerged (limestone-capped) islands, called by Davis "2-cycle islands," by others "the Limestone Caribbees." Dominica belongs with Davis' other group, the younger first cycle islands. That this volcanic-arc is of very recent geological origin is shown by the presence throughout the chain of recently active volcanoes (viz., on Martinique and St. Vincent) and also quiescent craters and fumaroles (viz., on Montserrat, Guadeloupe, Dominica, St. Lucia, and Grenada). Hill (20) has explained the origin of the first cycle islands in four ways: 1.) They are, according to an older view, continental islands—remnants of a former large land mass, perhaps Atlantis; 2.) they are orogenic islands, submerged peaks of a range which originally connected the mountains of Venezuela with those of the Greater Antilles; 3.) they are peaks on a great fold in the crust; 4.) the islands are truly oceanic in origin (viz., independent of continental masses), having arisen through the constructional pileup activity of successive (at first submarine) volcanic eruptions. The last explana-

tion has been the general one accepted by Hill and Schuchert as well as by certain biogeographers, most of whom hold to the theory that no continuous land connection (via the Lesser Antilles) has ever linked the Greater Antilles with South America.

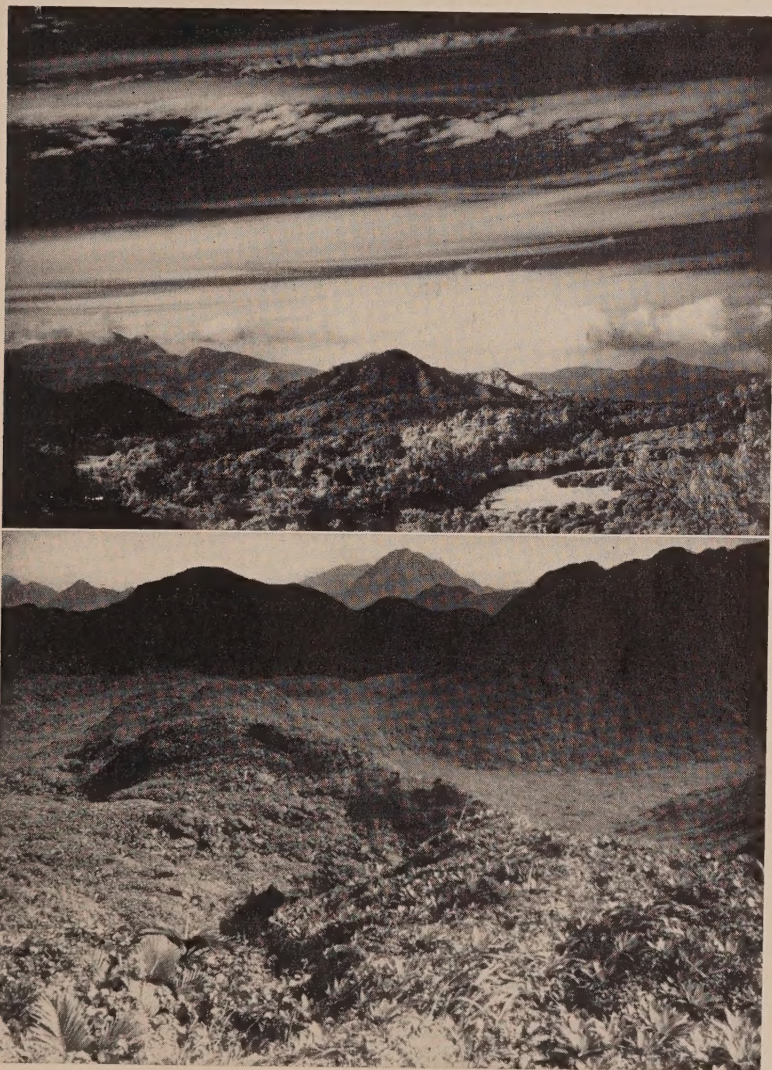


FIG. 4. The northern peaks of Dominica as seen from Sylvania. Morne Diablotin at left, Morne Couronne in center, and the twin peaks of Morne Grand Bois at right.

FIG. 5. The southern peaks of Dominica as seen from the north summit of Morne Trois Pitons. In the background are the Grand Soufrière Hills (left), Morne Watt (the highest peak in center), and Morne Micotrin (between Watt and the south ridges of Trois Pitons). The old crater of Morne Trois Pitons (foreground) is covered with elfin woodland.

Soundings show that the youngest Caribbee islands are based upon a submarine ridge, narrow (40–60 miles wide) in the vicinity of Grenada, but spreading to a width of over 200 miles in the north. From the mainly east-west Greater Antillean axis this north-south Caribbee ridge is separated by the Anegada fault-trough, over a mile deep, while from Trinidad another fault-trough, 2,400 ft. deep, cuts off the ridge from the east-west trending mountain axes of northeastern Venezuela. The age of the younger Lesser Antilles is unknown although the oldest rock-deposits (on Martinique), of an age when the volcanoes existed as shallow submarine banks, are Oligocene. Most writers believe that the semi-active volcanic islands of Guadeloupe, Dominica, Martinique and St. Vincent may have appeared in Miocene times but that the other islands arose during the Pliocene or Pleistocene. At any rate, the majority of stratigraphic records do not go beyond the Pleistocene coral-reefs.

The present island-mass of Dominica is situated on the inner side of the submarine arc with the result that the greatest ocean-depths lie west of the island. The submarine slopes on this side are apparently continuations of the precipitous landslopes for depths are reached of over 6,000 feet only six miles seawards. However, off the Atlantic coast the Dominica banks extend as marine shallows for over thirty miles, shallows which are broken by a depth of 4,200 feet in the Martinique Channel and by a depth of 2,340 feet in the Guadeloupe Channel.

Earle (13), a contributor to the knowledge of the geology of Dominica, suggests that the basement rocks of this island may be of Eocene age. Schuchert, however, thinks this estimate too early. The basement volcanic rocks of Dominica consist primarily of "augite or hypersthene andesites and black basalts." These are largely obscured, partly due to their obliteration by a covering of more recently ejected breccias and conglomerates and partly to the rapid and deep disintegration of the parent-rock, caused by the persistent weathering of a heavy rainfall. So thorough is this weathering that the rock itself is seldom apparent but the results of its disintegration are noticeable everywhere, particularly in the interior where the decomposition-product is visible as a bright red, ferruginous clay. As Earle has pointed out, this clay or earth has a definite distribution for, whereas it is widespread throughout much of the interior, it does not occur north of Vielle Case (except on the slopes of Morne au Diable) or south of Rosalie. On the more rainy windward coast it extends to sea-level, where it may be seen in all its brilliant coloring on many of the wind-swept bluffs and coastal headlands. On the drier leeward coast it is lacking, and according to Earle is seldom found lower than 1,000 feet.

Pleistocene submergence was widespread in the Caribbees but resulting marine gravels, tuffs, and fossiliferous deposits are scanty and limited only to the leeward coast between Roseau and Coulihaut. The shallowness of these deposits (300 feet) indicates that submergence in Dominica was too little to be of any great rock-forming importance. Nor are these the most recently formed rocks, for deposits of more recent lava-flows may often be found capping the sedimentary Pleistocene deposits. The Grand Savanna was probably formed

by such a lava-flow which, existing as it does on the dry leeward coast has not been as rapidly disintegrated as it might have been if situated in the rainy interior.

Volcanic activity on the island has not entirely ceased and well-known fumaroles exist on Morne au Diable, in the Layou Valley at Ravine D'Or, near Laudat, at Wotten Waven, at the Grande Soufrière northeast of Morne Watt, and in the Soufrière Valley. Most spectacular of these is the inaccessible group of fumaroles which forms, together with the ebullient Boiling Lake, the Grande Soufrière. In this amphitheatre, very properly called the Valley of Desolation, are a number of soufrières, large and small, whose continuous activity feeds many small hot streams, which are loaded with suspended sulphur. Sublimates of sulphur, crystalline gypsum, sinters and travertines are present with the basic andesitic rocks and the occurrence of excess quantities of certain of these compounds as well as the ever-present fumes has limited the growth of an otherwise aggressive montane-vegetation. The results are denuded barren-looking slopes. In January 1880 a violent eruption took place in this vicinity and the last volcanic sign was a severe earthquake in 1906.

SOILS

A red clay has been mentioned above as one of the characteristic soil types of Dominica. Following Hardy's classification (5) of the soil types of the volcanic Lesser Antilles, red clay or Red Earth, a type of Latosol, is considered as a Zonal Soil with impeded drainage. It represents the typical mature soil of the island's wet interior and as such is occupied largely by one of the types of rain forest (viz., "lower montane rain forest"). Highly compacted, because of its clayey nature, Red Earth is resistant to the percolation of water and so it is generally waterlogged. Moreover it is highly leached, acid, badly aerated, and impermeable, and tree roots are mainly confined to a dense surface mat. Because of these characteristics the Red Earth Soils of Dominica are, agriculturally speaking, highly infertile.

Of Intrazonal Soil types occurring in Dominica the Yellow Earths and Brown Earths are the commonest and the most important. They are young, calcimorphic, free-draining soils, the former a light loam without stones and with deep root penetration, the latter a stony clay. Because of their youth and lack of leaching these make highly fertile agricultural soils. The optimal type of rain forest occupies Yellow Earth. Yellow and Brown Earth Soils are to be found on the slopes of Diablotin and the adjoining northern part of the Layou River Valley, also throughout that southern part of the island delimited roughly by a line drawn diagonally from Roseau to Rosalie. Hydromorphic Shoal Soils, another group of Intrazonal Soil but of mature not youthful character, are found along the dry leeward coast. They have poor agricultural qualities including impeded drainage.

In Dominica Azonal Soil types are limited principally to the wet interior with Lithosols, representing recent volcanic deposits with free-draining characteristics, found on the upper slopes of Trois Pitons. Beard (5) describes another Azonal type, Mountain Podsol, from the young plateaux lying beneath the north-facing slopes of Trois Pitons.

RAINFALL RETURNS, DOMINICA, 1948.

STATIONS	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	TOTALS
1. Botanic Gardens..... L.	5.95	4.54	1.48	2.11	4.60	6.12	12.84	8.41	8.67	8.40	9.37	6.97	79.46
2. Bath Estate..... L.	6.75	4.78	3.06	2.09	6.38	10.02	18.52	12.08	11.93	10.76	10.95	7.82	105.14
3. Blenheim..... W.	4.32	2.49	7.77	4.39	6.95	10.44	11.98	6.65	8.48	21.07	13.44	3.77	101.75
4. Canefield Estate..... L.	11.42	7.25	2.50	1.00	6.54	10.26	17.74	17.60	6.16	3.28	10.11	7.42	101.28
5. Clarke Hall Estate..... L.	5.95	4.85	3.05	2.60	8.02	11.40	22.54	12.40	10.85	17.85	15.32	9.70	124.53
6. Colihaut Agri. Station..... L.	3.28	3.94	2.13	1.92	3.61	7.03	10.91	6.91	9.69	7.92	7.91	3.05	68.30
7. Delices..... W.	6.51	3.62	7.52	5.98	5.49	10.60	12.74	13.32	11.02	27.04	24.94	4.82	133.60
8. Experiment Station..... L.	6.98	6.03	1.99	2.37	8.00	8.53	23.19	13.25	10.94	11.02	15.46	12.66	120.42
9. Grand Bay Agri. Station..... W.	8.92	5.81	5.07	3.68	6.64	11.66	15.46	12.08	21.94	9.15	22.67	8.15	130.84
10. La Plaine Agri. Station..... W.	4.37	2.96	7.49	5.98	7.79	12.19	12.72	13.91	9.20	22.37	17.52	4.74	121.24
11. L'Imprevue..... I.	6.80	5.46	2.80	2.81	9.40	13.12	21.78	15.59	12.87	13.23	14.81	12.05	130.72
12. Layou Park Estate..... I.	10.12	7.78	11.50	2.85	19.07	21.40	36.72	19.89	13.76	20.10	28.50	13.02	204.71
13. Londonderry Agri. Station..... W.	5.58	3.32	6.31	4.17	6.63	13.13	11.48	10.36	23.09	27.91	29.06	3.17	144.41
14. Moore Park..... I.	4.50	2.63	7.79	5.01	7.10	10.95	12.17	7.09	8.03	21.09	13.13	3.56	103.05
15. Picard..... L.	6.03	6.63	6.79	2.95	5.94	8.71	14.84	12.05	11.80	15.78	10.15	6.16	107.83
16. Portsmouth Agri. Station..... L.	6.64	6.75	6.83	3.81	5.70	11.03	16.53	9.69	9.57	19.50	11.62	5.38	113.05
17. Pte. Mulâtre..... W.	6.11	3.88	8.16	4.13	4.56	12.16	10.30	16.09	6.76	20.64	25.88	4.65	123.32
18. Riversdale..... I.	16.39	8.74	16.97	11.29	19.44	26.88	32.33	19.19	25.68	24.36	36.64	12.47	250.38
19. Ridgefield..... I.	9.22	7.51	4.96	3.51	10.52	15.26	27.02	15.15	14.53	12.57	23.42	10.33	154.00
20. Stowe..... W.	7.42	4.12	6.18	4.75	5.54	12.37	14.13	10.52	8.93	20.85	25.79	6.90	127.50
21. Sylvania..... I.	12.90	7.50	6.40	5.90	15.70	25.60	42.10	28.20	21.40	24.50	24.50	15.30	230.00
22. Shawford..... I.	8.63	11.03	11.34	7.35	19.86	23.83	34.91	29.90	27.48	18.87	27.19	11.89	232.28

Mean Rainfall 22 Stations..... 136.72 inches.
 " " 8 Leeward Stations..... 102.50 "
 " " 7 Windward "..... 126.09 "
 " " 7 Inland "..... 186.41 "

This soil type is described as possessing a shallow (1-2 ft. deep) A-horizon composed of light, friable, stoneless clay underlain by a subsoil of cemented "hardpan," which, due to topography and rainfall, results in very poor drainage and poor agricultural characteristics. Mountain Podsollic Soil is occupied by less luxuriant types of rain forest.

CLIMATE

Dominica lies well within the tropics but as a result of her insular nature the temperatures are not as unbearable as in the continental tropics. Temperatures are highest at sea-level although even here the yearly average is about 79° F. with an average maximum of 84° F. and an average minimum of 75° F. (the figures are based on readings taken at the Botanic Station in Roseau). As can be seen from these figures the climate is equable. In the mountainous interior temperatures are markedly lower (about 10° F. cooler at 1,800 feet), and during the cooler months (February and March) the air may even be called invigorating.

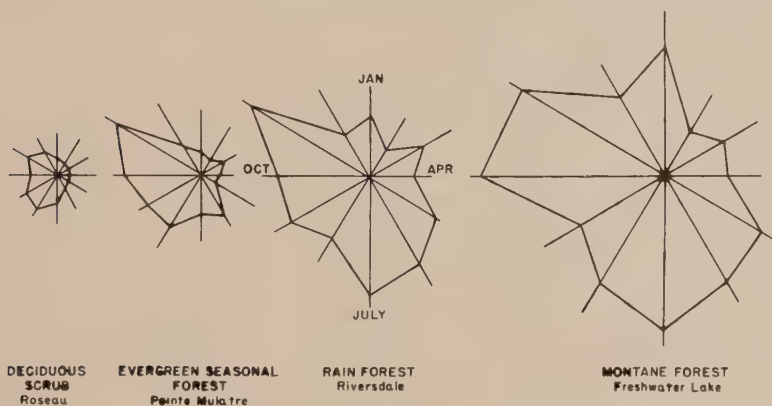


FIG. 6. Precipitation patterns for four stations in Dominica illustrating relative amounts and distribution of rain throughout the year for locations supporting deciduous scrub forest (Roseau), evergreen seasonal forest (Pointe Mulâtre), rain forest (Riversdale), and Montane Forest (Freshwater Lake).

A rare low of 52° F. was recorded at Sylvania (1,800') in January of 1949. At middle elevations, except for the high humidity, the climate is much like that of a warm New England summer.

The most outstanding climatic character of Dominica is rain. Even when neighboring islands are experiencing drought this isle is always well watered. The moist northeast trade-winds blow pretty constantly from the Atlantic making the eastern coast windward and the western coast leeward. The mountainous bulk of the island which lies between forces the winds upwards resulting in cooling and resulting heavy precipitation chiefly to the east of the height-of-land with the result that there is a marked difference in the amount of rain falling on the two coasts. This is best shown in the accompanying table of the rainfall for the year 1948, an average year (Fig. 6).

Precipitation is seasonal. The weather of an average year divides up into a dry season (mid January to mid June) following the winter solstice, and a rainy season (mid June to mid January) following the summer solstice. Actually the rainy season itself may be broken up into three subdivisions: a summer wet period (mid June to mid September), an autumn "break" (mid September to mid November) and a winter wet period (mid November to mid January). Although the autumnal "break" does not show up properly in tables of rainfall covering its duration the "break" in precipitation is none the less real for complete sunny days are the rule throughout this period with occasional heavy showers occurring only at night. Furthermore, the autumn "break" is a windless season which, in November, becomes typical of doldrum weather. The average mean of a 27-year period indicates that April is the driest month of the year. The period of greatest rainfall includes the months of June, July and August, but November and December are also quite wet. Lack of rain in this season is only noticeable on the lower leeward slopes where exist xerophytes with small deciduous leaves, normally shed at the initiation of the dry period. During the same period flowering takes place at this level. It is to be noted that, despite the poor distribution the average annual rainfall (about 75 inches at Roseau) on Dominica's "dry" leeward coast surpasses the annual precipitation of the eastern United States and in fact it is higher than leeward coast rainfall elsewhere in the Caribbees. Elsewhere on the island the precipitation is well distributed throughout the year and so there is no noticeable lack of water during the "dry" season. Windward coast stations regularly average over 100 inches of rain; stations situated in the zone of rain forests average over 200 inches while on the highest mountain summits the precipitation, though unrecorded, is great and possibly reaches even 400 inches per year.

Dominica's rains are nearly always heavy, partaking of the nature of tropical downpours. However, they are often of short duration and of local occurrence and during the day a given area, even in the rainy interior, usually has intermittent periods of heavy showers and brilliant sunshine. At times the fall becomes torrential and the rivers rise suddenly to unbelievable and destructive heights, their waters churning everything before them. Dominicans describe such occurrences with the simple statement that "the rivers have come down." In early September 1942 after a cloudburst the not uncommon reading of nine inches of rain in a single 24-hour period was recorded at Sylvania. Under such rainy conditions heavy landslides are recurrent on the innumerable steep slopes.

Atmospheric moisture is high on this island of rain, and even in Roseau on the leeward coast the relative humidity fluctuates between 50% and 80%. In the interior it seldom falls below 85% and at night the atmosphere undoubtedly approaches total saturation.

Dominica lies just west of the chief point of origin of West Indian hurricanes, which move in these areas almost invariably from east to west or southeast to northwest. These storms usually are "in season" from July to September and although they do not reach their full force until after they have passed over the island, the high winds and accompanying destructive downpours nevertheless cause severe damage to local agriculture.

AGRICULTURE

Because of its mountainous nature, which makes the cultivation of crops difficult, Dominica has not attained the agricultural development found on certain other Lesser Antillean isles. This fact helped to keep the island in the hands of its savage Carib owners for several centuries longer than neighboring islands. Even today Dominica remains the last refuge for miscegenated remnants of these aborigines, a handful of whom still live in a Reserve on the windward coast around Salybia. The writer has cooperated in an investigation (31) of the economic plants utilized by Island Carib today and this study gives us an idea of some of the native species these Indians were using prior to that Sunday in November of 1493 when Columbus, on his second voyage to the New World, made his first landfall and called it Dominica, or Sunday Island.

Although primarily fishers and hunters the Caribs cultivated the principal subsistence crops grown throughout the lowland tropics of the Americas including such staples as bitter manioc, (*Manihot*), maize, and sweet potatoes. They also grew several species of tannias (*Xanthosoma*) and knew a number of wild food plants of an emergency character such as wawa (*Rajania cordata*). The Caribs on neighboring Guadeloupe were the first to introduce Columbus and his party to the pineapple. Other fruits like guavas, papayas, and several species of annonas were doubtless grown.

Economic plants also served as an aid in the pursuit of game or fish. Bow-wood was obtained from a palm (*Coccothrinax*), arrow-shafts from inflorescence stalks of a grass (*Gynerium*), while the strong leaf fibers of *Bromelia pinguin* were fashioned into bow-string, fish-line, and the like. Local fish (and arrow) poisons were known including potions made from select parts of such species as *Clibadium sylvestre*, *Diospyros ebenaster*, and *Pithecellobium jupunba*. Caribs were skilled canoists (our word, canoe, is a direct derivation of the Carib word) and used the giant gommier (*Dacryodes*), acajou (*Carapa* ?), and poirier (*Tabebuia*) from which to construct several types of sea-going craft.

Besides the plants listed above these Indians utilized a great number of other plants too numerous to mention but associated with such domestic demands as basketry and weaving, kitchen or household utensils, dyes, shelters and thatching, and native medicines or charms.

The power of the Dominica Caribs was finally broken in the middle of the eighteenth century and the island was made available for European settlement. Dominica was ceded to Great Britain for the first time in 1763. Prior to that date, and due to the Carib menace, it had been considered a neutral island but despite that fact French colonists and their African slaves had begun to settle there around 1750. From them was derived the French patois in such common usage today among the peasants of Dominica.

Sugarcane had been introduced into the New World by Columbus on his second voyage. It soon became one of the staple crops in the West Indies and so was one of the first economic species planted on Dominica by the French. The other prominent species which possibly preceded sugarcane in establishment on the island was coffee. By the year 1787 indigo, cotton, and cacao had also become important export commodities of Dominica but of these only cane and cacao are still grown

today on a commercial basis. Actually the lack of flat land never made it possible to establish large plantings of such field crops as sugarcane and cotton and so with the abolishment of slavery in the 19th century the few larger estates, devoted to the culture of these plants, were no longer able to compete favorably with other cotton and cane producing islands in the Caribbean. Today sugarcane is the least important of Dominica's crops; what little is grown is exported as rum.

During the past century field crops were largely supplanted by orchard crops which now are the backbone of Dominica's insignificant agricultural economy. Trees are much better fitted to the broken terrain of this rugged island. Due largely to the efforts of Dr. John Imray* the lime became the staple crop and for many years Dominica was known as the world center of lime production. Competition from the Sicilian lemon and the inroads of diseases such as withertip have had their effects on the local industry yet the lime still remains the most valuable export crop (Fig. 7). The most important lime products exported are raw juice and distilled lime oil, but ecuelled lime oil and green limes also enter the export trade—practically all destined for Britain or her possessions.

The production of other tropical fruits nearly equals in value that of the lime industry and Dominica has excelled in this field, shipping most of her production to Bermuda and Canada as well as to other British isles in the Lesser Antilles such as Barbados and Antigua. The present status of agricultural production is shown in recent Annual Reports of the Department of Agriculture (Dominica) wherein grapefruit and oranges are listed as most important (after limes) but the production of avocados, mangos, and bananas is also substantial. Following these and in order of importance as export commodities are raw cocoa, vanilla, copra and coconuts, and oil of bay. Certain of these crops have been speculative, in particular vanilla, bananas and bay oil. For example during World War II and because of worldwide shortages, there was a local boom in vanilla. For each of the years, 1945 and 1946, the value of the vanilla beans exported exceeded that of all lime products of the same years.

As pointed out earlier, land available to profitable agriculture is limited by the ruggedness of the terrain and the concomitant transport difficulties to say nothing of the dire results caused periodically by diseases and hurricane. It is estimated that only 4% of the total area of Dominica is permanently cultivated, chiefly to the important tree crops mentioned above. The principal estates are located in the vicinity of Roseau and Portsmouth, the chief shipping points, whereas the so-called "provision gardens" (the equivalents in Dominica of Central American *milpas*) of the peasantry are often in the interior at a considerable walking distance from the coast. Beard (5) has indicated that down through the years the economic trend in the Lesser Antilles has been to break up the old estates and to descend more and more towards subsistence agriculture. This trend was speeded up in World War II.

Brief mention should be made of the attractive Botanic Garden at

*A Scotch physician long resident as principal medical officer on Dominica. Imray was a devoted student of the Dominica flora and his collections are the basis of the records for Dominica which appear in Grisebach's flora.

Roseau. This was established in 1891 with the object of supporting agricultural development on the island primarily through the culture of plants "of an economic or industrial character" (38). Experiments, largely agronomic and horticultural, are carried out with the island's main crops; new or proven varieties of tropical crops are tested, increased, distributed locally; while agricultural education and extension work also are undertaken. In addition there is maintained an excellent living collection of tropical woody species of an economic or ornamental nature and of which the collection of palms is especially notable (Fig. 8).



FIG. 7. Lime orchards in the Roseau Valley.

FIG. 8. Rows of wine palms (*Raphia*) in the Botanic Garden at Roseau.

CLASSIFICATION OF PLANT COMMUNITIES

The vegetation of Dominica is probably closer to its original state than is the vegetation of any other island in the group of the Caribbees.* With the exception of the botanically well-known French Antilles the plant ecology of this island arc has been but sketchily known until very recently.

Domin (10) was the first to outline briefly a few of the more outstanding plant communities in Dominica, and I have also published a preliminary account of the vegetation (28). More recently there have appeared two important papers discussing the major vegetational types of the Caribbees. These papers, one by Beard (5) and one by

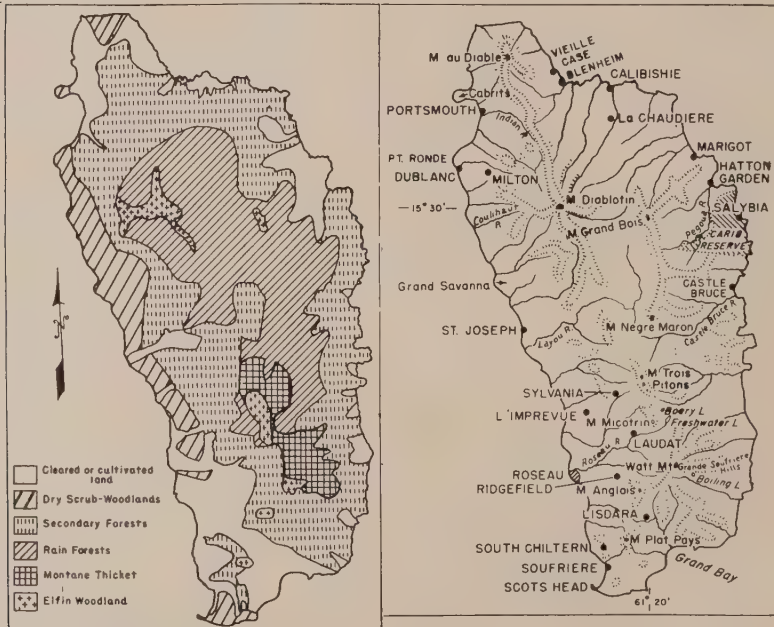


FIG. 9. Vegetation map of Dominica. Adapted in part from Beard (5).
FIG. 10. Map of Dominica showing principal localities studied.

Stehlé (48), differ in their nomenclature. Nor are the vegetational types discussed in harmony with the names used in the admittedly sketchy classification published by me. However all three writers do recognize essentially the same series of plant communities if under different names; and all three writers do point out that climate is the basis of their classification.

Beard's excellent and exhaustive account for the Caribbees follows a physiognomic classification of vegetation originally proposed by him in 1944 (3) for all tropical America. Whether his classification can be

*The Caribbees form an archipelago including all islands lying between Anguilla in the north and Grenada in the south.

applied in its present form to all of the American tropics and especially to continental areas is debatable. However it is certainly most useful for the Lesser Antillean area and in recognition of this fact and with the idea of stabilizing vegetational nomenclature it was adopted tentatively by members of the first Pan-Caribbean Forestry Meeting in 1946 for general use in this region. In order to continue uniformity of treatment of plant communities in the Caribbees the present expanded account of the vegetation of Dominica is modified from my earlier one so as to follow in a general way Beard's classification.

Five primary plant formations may be recognized in Dominica* of which four are climatic and one edaphic (Fig. 9). In the convenient order in which they appear zonally, running from sea-level to mountain-top, they are:—1) SWAMP FOREST FORMATION—the only primarily edaphic formation of Dominica and unimportant because of its very localized extent; 2) DRY EVERGREEN FORMATIONS—represented chiefly by the "Littoral Woodland" of the windward coast; 3) SEASONAL FORMATIONS—including the xerophytic and intermediate vegetation of the lower and middle leeward slopes, characterized by often-spiny, deciduous (rainy-green), scrub woodland or semi-evergreen or evergreen forests occupying belts with pronounced seasonal drought; 4) RAIN-FOREST—the optimal formation of the rainy mountainous interior, characterized by luxuriant high-stemmed, broad-leaved trees; and 5) MONTANE FORMATIONS—including among others associations of poorly-drained upland soils of the exposed ridges and of the uppermost slopes and summits of the highest volcanic peaks, where is found a low, wind-twisted, impenetrable growth of small trees forming so-called "Elfin Woodland" (or "Mossy-" or "Cloud-Forest"), which occupies a zone of almost constant mist and rain.

Beard (5) has given an excellent summary of the zonation shown in the distribution of the climax formations of the Lesser Antilles and since this zonation is so clearly defined in Dominica it is worthwhile repeating certain excerpts from Beard's account here:—

"The great majority of the climax formations of the Lesser Antilles are climatic, predominantly determined by the influences of climate rather than by those of soil or site.

"The distribution of the climatic formations follows variations in the local climate within each island, mainly those changes brought about by topography. While soil factors are always important, they lack the controlling force of the climate. Accordingly the climatic formations are zoned in a pattern identical with that of the local climate, and, as the climatic belts are arranged in a more or less concentric series around the central mountain masses, we find the forest types also disposed more or less in concentric rings—according to the lie of the ground—and in each island there is a regular progression through all the formations from sea-coast to mountain summit (Fig. 11).

"Immediately along the coastal margin the dry evergreen formation littoral woodland occupies a narrow and restricted zone under the influence of the salt-laden sea wind, which is desiccating,

*Out of six listed by Beard (5). Because of the lack of low-lying land Beard's "Seasonal Swamp Formations" (including true savanna) do not occur in Dominica.

mechanically destructive, and harmful to leaf tissue owing to the fine salt spray which it deposits. Behind the littoral comes a broad zone of lowland forests, either dry evergreen or seasonal, under the influence of relatively dry climate. The whole of this zone in all the islands has at one time or another been cleared and used for agriculture and there are no longer any of the original forests left. We can only infer the nature of these from a study of secondary woodlands and of climatic data, both of which can be compared with the conditions surrounding actual forests still in existence elsewhere, as in Trinidad. Under the influence of the low rainfall, severe annual drought, and dry winds of the coast lands there would have been a zone of somewhat xerophytic forest nearest to the sea. Ascending inland, as rainfall increased zones of successively more luxuriant forest would have been entered.

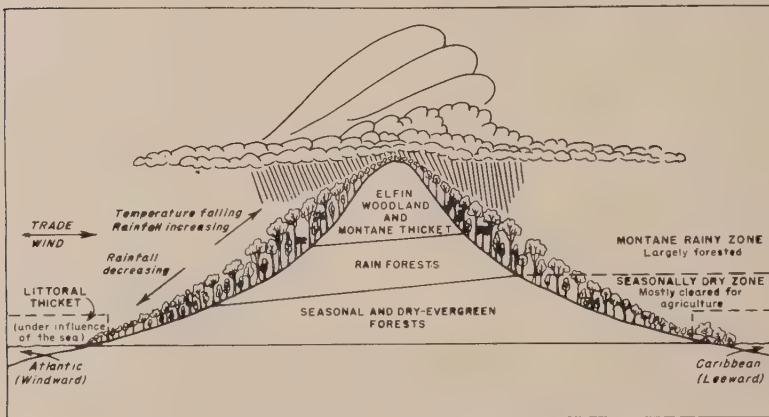


FIG. 11. Diagrammatic cross-section of Dominica showing arrangement of vegetational zones. Adapted from Beard (5).

"Continuing to ascend to the interior a point is in due course reached where the annual drought ceases to be effective, and there is an abundant moisture supply all the year round. This is the zone of the rain forest, finest and most luxuriant type of forest within the tropics. From here onwards we are ecologically on sure ground, for the greater proportion of the forests at the higher levels remain and can be studied in their primitive state. The limiting drought factor of the coast lands steadily diminishes inland and we can imagine the original forests growing taller, less xeromorphic in life forms, more complex in structure, and more full of epiphytes, ferns, mosses, and small delicate plants, as the rain forest was approached. Above the level of the rain forest precipitation continues to increase and moisture is always in copious supply. The rain forest, however, does not continue to the mountain tops, but gives way to a series of montane forests (lower montane rain forest, montane thicket, and elfin woodland) in which growth is again progressively reduced in stature and forms. The rain forest

is a central optimum in these islands from which depart seawards a descending series of seasonal or dry evergreen forests and mountainwards a descending series of montane forests, in both cases due to the climate becoming progressively less favorable to plant growth. In the lowland forests the essential limiting factor appears to be drought. In the mountains it appears to be exposure. In both areas, however, soil factors introduce complications which may tend to modify the ideal climatic zonation."

The description of the Dominica plant formations together with the communities which follows is largely floristic and is based primarily upon the field notes of the writer. Where hiatuses have existed I have freely borrowed from Beard (5) who treats however primarily of the trees. The reader interested more in vegetational and ecological aspects of the flora of Dominica is referred to the above source.

1. EDAPHIC CLIMAX FORMATIONS

In most of the Caribbean area two formations may be recognized in this category, the "Mangrove Woodland" of brackish water, and the "Swamp Forest" of fresh-water. The common genera of mangrove (*Rhizophora*, *Avicennia*, *Laguncularia*, and *Conocarpus*) are absent in Dominica, a fact easily accounted for by the lack of sufficient lowland sites on an island where the coastline is very precipitous.

Seawards of the few sites where mangroves eventually might become established may be found seral pioneer communities of submerged marine hydrophytes belonging to the group of monocots.

Narrow-leaved *Diplanthera wrightii* and the broader-leaved turtle grass, *Thalassia testudinum*, are the chief plants of this area and probably are to be found associated with various marine algae in most of the shallow sandy bays of both coasts. Sizeable colonies may be seen just below low-tide level along the beaches and lagoons at Calibishie on the windward coast, and every ship that weighs anchor at the Roseau and Portsmouth anchorages uproots individuals of these species.

1. Swamp Forest Formation

Although present in Dominica this climax formation is very localized and consequently unimportant. Lack of extensive lowland swampland again is the cause. When found (chiefly at the north end of the island) Swamp Forest is composed of rather pure stands of the extensively buttressed and dominant tree, *Pterocarpus officinalis* (Fig. 12). Fringing colonies of this species occur near the mouth of the sluggish Indian River (just south of Portsmouth), also in riparian sites near the beach at Calibishie as well as along the main road just east of Blenheim.

Secondary communities leading perhaps to Swamp Forest may be seen on the old salt-flats east of the Cabrits (northwest of Portsmouth). These insignificant flats are either partially open meadowlands, grazed by sheep and goats, or thicket-areas, the muddy floor of which is populated by crabs and domesticated swine. The swamp-thickets of this area merge with the beach-thickets of Douglas Bay to the north and with those of Prince Rupert's Bay to the south, and are composed of the same species with the addition of *Chrysobalanus icaco*, *Clerodendron aculeatum*, *Cornutia pyramidata*, *Ficus laevigata*, *Jatropha* spp., *Rau-*

volsia lamarckii, *Tabernaemontana citrifolia*, and *Morinda citrifolia*. In the partial shade of the thickets *Salvia serotina*, *Ocimum micranthum*, and *Indigofera suffruticosa* are often found; where sunny grassy (*Paspalum laxum*) swales occur one sees sedge communities composed of *Eleocharis flavescens* and *E. mutata* as well as species of *Fimbristylis* (*F. annua* and *F. spadicea*). Here too are *Rhynchospora setacea*, creeping *Cyperus brevifolius* and scattered specimens of *C. ligularis*, *C. luzulae*, *C. polystachyos*, and *C. sphacelatus*. Growing in the wet with *C. brevifolius* is tiny *Ilysanthes microcalyx* of the Scrophulariaceae. Showier plants, but with evanescent petals, include *Jussiaea suffruticosa* of the Onagraceae and *Pterolepis glomerata* of the Melastomaceae. *Acrostichum daneaefolium*, a tall fern, usually forms conspicuous and perhaps transitional colonies in more sunny mucky situations and is to be found along the Indian River associated with the semi-woody arum, *Montrichardia arborescens*. Farther up the Indian River these species are replaced by or associated with *Hibiscus tibiaceus* (Mahot doux) and *Pterocarpus officinalis*.

II. CLIMATIC CLIMAX FORMATIONS

2. Dry Evergreen Formations

a. Littoral Woodland

Along the full extent of the windward (Atlantic) coast may be found a narrow belt of shrubby vegetation so constantly windswept by the ceaseless northeast trades that the gnarled branches, "trained" by the combined action of wind and salt-spray, seem to have been forced against the bluffs and headlands by some giant's brush (Fig. 13). It is a sort of Elfin Woodland at sea-level. On the landward side of this "littoral hedge," away from the salt spray, the vegetation rapidly increases in stature to tree size and merges into the neighboring evergreen and somewhat transitional forest. Beard calls the Littoral Woodland a "formation of convenience." Actually it is a complex of several associated communities for although easily recognizable, physiognomically speaking, certain of its dominant species are not always limited to the windward coast but occur occasionally on the leeward side of the island as well.

Dominating this formation are *Coccoloba uvifera* (Raisin bord-dermer), *Chrysobalanus icaco* (Z'icaque), and *Erithalis fruticosa* (Bois chandelle). The increasing stature on the sheltered side is due in part to the presence of such species as *Tabebuia pallida* (Poirier), *Diospyros ebenaster* (Babarra), *Rheedia lateriflora*, *Calophyllum antillanum* (Galba), *Manilkara bidentata* (Balata), *Terminalia catappa* (Zamandier), *Coccoloba* spp., *Rhyticocos amara* (Yattahu), *Coccothrinax* sp., *Rhus metopium* (Gommier l'incense), and numerous *Myrtaceae* and *Myrsinaceae*.

True Littoral Woodland does not occur on the leeward coast but, as already noted above, certain of its component species, in particular *Coccoloba uvifera*, may be found. On the more sheltered Caribbean coast this species grows in the scattered beach thickets along with pantropical *Thespesia populnea* or with such occasionals as *Caesalpineia bonducella*, *Dalbergia ecastophyllum*, and *Bontia daphnoides*. Poisonous *Hippomane mancinella*, though generally met with elsewhere in the

Caribbees, is not common on the leeward beaches of Dominica. It has been seen only along the sheltered white coral strand of the tiny peninsula linking Scot's Head to the south-west mainland.

Seral communities leading to the climatic Littoral Woodland are limited almost solely to those of the sandy beaches, for the numerous bluffs themselves are generally occupied by "littoral hedge" on the windward coast or by xerophytic scrub on the leeward coast. As a matter of fact, because of the widespread occurrence of bluffs or sea-cliffs in



FIG. 12. *Pterocarpus officinalis* in swamp forest along the Indian River.

FIG. 13. Aspect of littoral woodland along the windward coast near the Crayfish River in the Carib Reserve.

Dominica, beaches are often lacking along extensive reaches of the coast. When present, beaches are of two types, formed either of large boulders or of black volcanic (or rarely white coral) sand. The bouldery type generally lacks higher vegetation while the sand beaches support the common strand-species of the Caribbean region. These pioneers are the herbaceous and extensively creeping vines, magenta-flowered *Ipomoea pes-caprae* (Beach morning-glory) and *Canavalia maritima*, which are associated now and then with the yellow-flowered creeping pea, *Vigna repens*, as well as with colonies of grasses such as closely compacted *Sporobolus virginicus* and *Cenchrus pauciflorus*. Certain annuals, particularly species of *Boerhavia*, *Talinum*, *Crotalaria* and *Polanisia* are also found but generally on more sheltered sands. Where the sands have been stabilized or where a kind of turf is established one may find other low herbs such as prostrate euphorbias, the creeping grasses *Cynodon dactylon* and *Dactyloctenium aegyptium*, the yellow-flowered composites, *Wedelia trilobata* and *Pectis humifusa*, or pink *Portulaca pilosa*.

The latter group of plants generally occur on the older established beach beyond the limit of action of storm-waves. Here also is the pioneer zone for a low scrub vegetation which is intermediate in succession to the climax. Typical species would include *Opuntia dillenii*, *Suriana maritima*, *Strumpfia maritima*, *Lantana involucrata*, *Dodonaea viscosa*, *Ernodia littoralis* as well as pioneering dominants, especially *Coccoloba wifera* and *Chrysobalanus icaco*.

3. Seasonal Formations

a. Dry Scrub Woodlands

Between the halophytic vegetation of the shore and the secondary evergreen forests farther inland there occurs on the leeward slopes (except where soil is too shallow as on the Grand Savanna, or where the woodlands have been destroyed through cropping or grazing) a low tropical woodland characterized by a diverse number of deciduous microphyllous species. It may be seen on the coast to the north of Morne au Diable, on Prince Rupert's Head, on the west coast from Pointe Ronde to the Boery River, and then again at the southern tip of the island east of Scot's Head. This xerophytic scrub-woodland is the climax-formation, the mixed species of which often form an almost impenetrable thicket covering the dry, rocky slopes. The upper boundary of this climax is limited directly by the amount of rainfall. The annual precipitation of the zone averages about 85 inches; this is 20 inches less than windward coast stations at this altitude, and is more than 100 inches less than stations located in the rain forest belt.

The boundary between the xerophytic woodland and the next higher community is near the one thousand foot level, but the line of demarcation is not sharp but is rather straddled by transitional forest of a secondary nature, composed partly of deciduous xerophytic elements from below and partly of evergreen elements from the rain forest above. As would be expected the secondary forest extends farther down the moist river-valleys than it does on the intervening ridges—in fact the main streams of the leeward slopes enable tongues of secondary forest to extend nearly to the shores of the Caribbean sea.

If equally distributed throughout the year 85 inches of rain would probably eliminate the leeward scrub-woodland. However, a seasonal precipitation, on the leeward coasts causes a drought-period which extends roughly from February to June. This dry season is the real cause for the presence of dry forests. In other words, Dominica's slopes are so steep that unless the rainfall (on the lee coast) averages at least 100 inches per year the run-off is too rapid to permit the establishment of any other type of vegetation except a xerophytic one. This fact is well illustrated by the numerous attempts made at the Botanic Station at Roseau to establish in the gardens some of the more interesting native trees of the rain forest. Even on the relatively flat park-land the intolerance of the dry period by these species has made their culture generally impossible.

During the rainy season (roughly from June to January) the scrub-woodland is in full leaf and the general aspect of the leeward coast, as seen from the sea, is one of lush greenness. With diminishing rains in January and February the scene begins to change. Leaves of the many deciduous species begin to wither and usually by March and April they have fallen (Fig. 14). This marks the beginning of the flowering season. At this time of year land can be easily cleared by burning the dry forest and so gardens are made. The season is known to the natives as Carême (Easter). Flowering is over by May and new vegetative growth begins to appear. The quick expansion of the leaves is brought on by the early June rains.

No other vegetational region on Dominica possesses as many showy-flowered species as does this xerophytic one. Most prominent at time of anthesis are species of the Leguminosae: thicket-forming *Haematoxylon campechianum* (Logwood) with its bright yellow racemes, a species of *Sabinea* (Caribwood) with gorgeous red flowers scattered along the whole length of its branches; *Calliandra tergemina* with showy pink-and-white bottle-brush-like stamen-masses, and lavender-flowered *Lonchocarpus violasceus* (Savonette). Also present are *Parkinsonia aculeata*, and species of *Pithecellobium* and *Albizzia*. Species of *Croton* of the *Euphorbiaceae* are also represented, among them the co-dominants, *C. astroites*, *C. corylifolius*, and *C. niveus*. Scattered in this leafless (at this season) scrub-woodland there are also a few small evergreen trees: *Eugenia procera*, *E. cordata*, and *E. ligustrina*, *Zanthoxylum trifoliatum*, and species of *Myrcia*. Other components of this community represent a wide range of families; including such plants as *Acrocomia aculeata* (Grugru), *Aiphanes* (Grigri), *Annona glabra*, *Miconia laevigata*, *Casearia parviflora*, *Diospyros ebenaster*, *Psidium guajava* (Guava), *Rauwolfia lamarckii*, *Zanthoxylum spinifex* as well as species of *Capparis*, *Pimenta*, *Pisonia* and *Nectandra*.

Here and there a few taller arborescent species accent an otherwise low scrubby landscape. The most noticeable of these is white-flowered *Bursera simaruba* (Gommier rouge) with reddish exfoliating bark; here also is *Tabebuia pallida* whose beautiful pink flowers are familiar along the coast particularly in April. The latter species is much sought after for its valuable wood; individuals are generally gnarled and with crooked boles but when grown under sheltered, well-watered conditions *Tabebuia* is a fine, straight and lofty tree. But the real giants of this zone are

Hymenaea courbaril (Courbaril) and giant buttressed *Ceiba occidentalis* (Fromager). These two species are not common and are generally to be found as widely scattered individuals in the shelter of ravines or close to the boundary of the secondary forest.

Arborescent species are the rule in the xerophytic woodland but climbing vines are common in numbers if not in species. Most characteristic is yellow-flowered *Stigmaphyllon puberum* of the Malpighiaceae. *Bignonia unguis-cati* is also frequent, while twining *Abrus precatorius* and prickly *Mimosa casta* are to be found everywhere. The floor of the scrub-woodland is dry, rocky, and usually barren of terrestrial species. Isolated clumps of sedges are sometimes seen, the commonest species being *Fimbristylis monostachya*, *Scleria pterota*, and *S. lithosperma*. Now and then one may find a large clump of bromeliads, *Bromelia karatas* or more rarely *Wittmackia lingulata*. Here too occasionally occur three species of ferns, attractive *Adiantopsis radiata*, *Anemia adiantifolia*, and *Doryopteris pedata*. On rocky outcrops grows *Anthurium grandifolium*, a large-leaved aroid which also occurs in the rain forest and montane formations as an epiphyte. True epiphytes are limited to the genus *Tillandsia*, of which *T. utriculata*, *T. fasciculata*, and *T. polystachya* are the common species. Mistletoes of the genus *Phoradendron* (Capitaine bois) are frequent and apparently parasitize a wide range of xerophytic species.

b. Seral vegetation of disturbed xerophytic areas

Thus far the description has dealt with the undisturbed scrub-woodland which is a climax community of Dominica's leeward coast. At present this xerophytic woodland has been reduced considerably in size through the activity of man and it covers only about one half of its original area. Much of the land formerly occupied by woodland is now utilized either for crops or for grazing purposes. Because the majority of the villages of Dominica are situated on the leeward coast it has been natural to have adjoining lands used for the seasonal cultivation of local food crops such as sugarcane, dasheens, sweet potatoes, and various types of yams. Lime orchards, which have been one of the chief sources of revenue for the island, occupy the protected river-valleys especially near the capital town of Roseau (Fig 7). The mango and tamarind are thoroughly naturalized and are to be seen commonly along the roads as well as in all the villages.

The elimination of the original dry woodland has permitted the establishment of many common tropical weeds which line the trails and roadsides and overrun all the fields and pastures. Foremost among these are members of the Gramineae with species of *Panicum* and *Paspalum* predominant. *Cenchrus echinatus*, *Chloris inflata* and *C. radiata*, *Eleusine indica*, *Antheophora hermaphrodita*, *Axonopus compressus*, *Digitaria horizontalis*, *Andropogon condensatus*, and *Sporobolus indicus* are among the commonest species seen and these associate with the sedges, *Cyperus compressus*, *C. tenuis*, *C. rotundus*, and *C. sphacelatus*—to name a few. The Leguminosae are represented by species of *Crotalaria* (particularly *C. retusa*), *Cassia* and *Desmodium*, as well as *Alysicarpus vaginalis* and *Mimosa pudica*. Also in other families the more prominent genera are *Euphorbia*, *Phyllanthus*, *Sida*, *Bryophyllum*, *Leonotis*, *Borreria*, and *Lantana*.

c. *The vegetation of the Grand Savanna*

The vegetation of the Grand Savanna (situated midway along Dominica's Caribbean coast between St. Joseph and Colihaut) is of interest, for this barren-looking promontory with an area of perhaps a square mile is probably the island's most recent lava-flow. This expanse of grassland and open scrub lies within the boundaries of the scrub-woodland and in fact probably represents a degradation of that community through the action of fire, which is set periodically by the peasants in order to improve grazing (Fig. 15). The dominance of savanna condi-

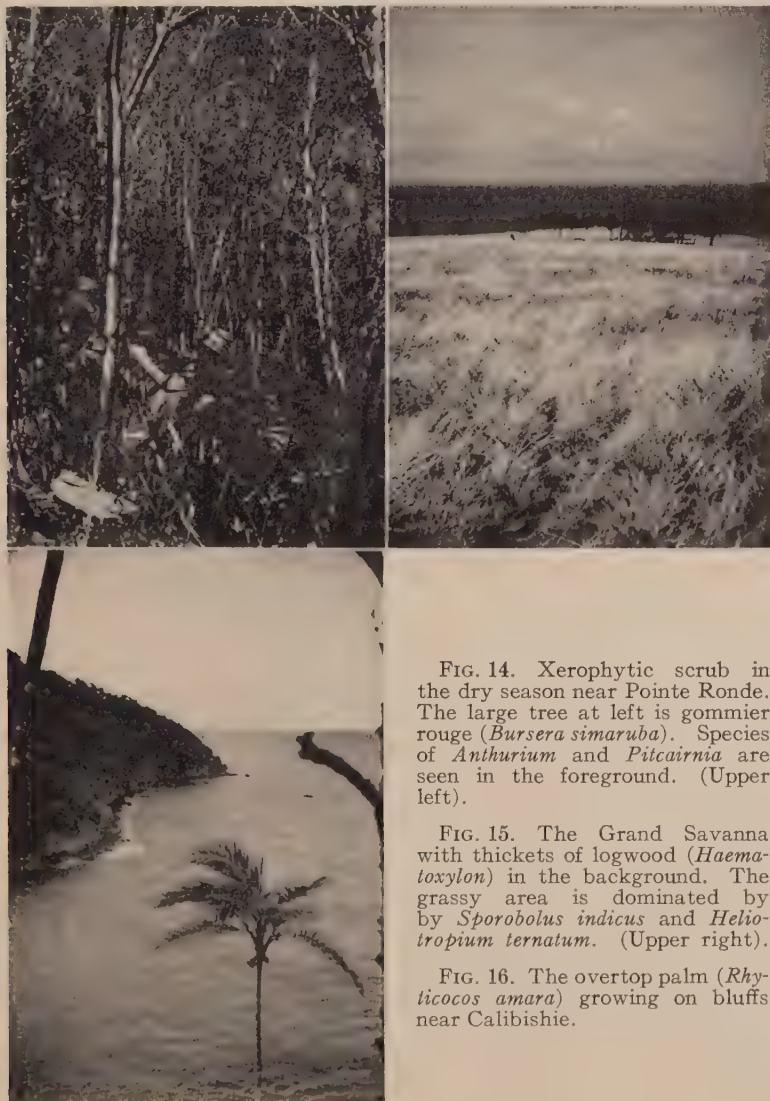


FIG. 14. Xerophytic scrub in the dry season near Pointe Ronde. The large tree at left is gommier rouge (*Bursera simaruba*). Species of *Anthurium* and *Pitcairnia* are seen in the foreground. (Upper left).

FIG. 15. The Grand Savanna with thickets of logwood (*Haematoxylon*) in the background. The grassy area is dominated by *Sporobolus indicus* and *Heliotropium ternatum*. (Upper right).

FIG. 16. The overtop palm (*Rhytidococos amara*) growing on bluffs near Calibishie.

tions is no doubt aided by the shallowness of the soil combined with the waterless nature of the area. Two species dominate the open grassy savanna areas: one is the grass *Sporobolus indicus*, the other is *Heliotropium ternatum*, a white-flowered herb of the Boraginaceae. With these are associated a number of species of secondary importance such as the grasses, *Eragrostis ciliaris*, *Andropogon condensatus* and *Cenchrus echinatus*; the sedges *Bulbostylis capillaris*, *Fimbristylis monostachya*, and *F. annua*; also miscellaneous species of *Sida*, *Borreria*, and *Pectis*. The Savanna is the only known station on Dominica for the adventive *Aloe barbadensis*. Scattered over the savanna either as individuals or in thickets are several woody species, particularly *Haematoxylon campechianum* (Logwood), *Stigmaphyllon cordifolium*, and *Byrsonima lucida*.

The seaward face of the Savanna is composed of low cliffs covered principally with woody species common to the dry scrub-woodland. Several succulents, to be found on all the leeward sea-cliffs between St. Joseph's and Pointe Ronde, are especially common here. These include species of *Opuntia* and *Cereus* as well as *Agave medioxina*, a large endemic species of the Amaryllidaceae whose orange flowers appear during March and April. *Pitcairnia gracilis*, with its brilliant red flowers appearing during the summer, also forms clumps on the cliffs while in rock-crannies tufts of *Psilotum nudum* occasionally are found.

d. *Secondary forests of an evergreen or semi-evergreen type*

On the leeward slopes, at an elevation of about one thousand feet, evergreen forests appear. They occupy a belt where certain species of the scrub-woodlands merge with species from the rain forest. In addition there are species which are typical only of this community. I have called them elsewhere (28) "species of the transition." The latter make excellent "index-species" in defining the limits of the plant communities shared by both the Caribbean and Atlantic coasts.

It has already been shown that xerophytic vegetation is limited to the leeward (Caribbean) slopes. This is caused by the direction of the prevailing winds, the northeast trades, whose moisture is precipitated chiefly on the windward slopes and on the central peaks leaving the leeward coasts with reduced rainfall. Rain is well distributed throughout the year at lower elevations on the Atlantic side and this accounts for the elimination of xerophytic conditions on this seacoast. Instead, lying between the littoral woodland of the seacoast and the rain forest formation of the mountainous interior (which is here quite close), is a continuation down to sea level of the evergreen secondary forest of the lee slopes. An examination of the distribution of some of "index-species" of this community will better demonstrate the area covered by this evergreen forest. A palm, *Rhyticocos amara*, known only from Dominica and the neighboring French islands, is conspicuous in the evergreen forest of the leeward slopes at elevations ranging from 800 to 1000 feet. Stands of this palm are common on the road between Pointe Ronde and Milton as well as along the trail from Dublanc to Milton. *Rhyticocos* seldom grows on the lee-slopes below this altitude and has not been seen by me in the true xerophytic community. On the Atlantic side of the island however, this palm is everywhere, scattered as occasional trees throughout the evergreen woodlands and on nearly every coastal bluff

from the vicinity of Vielle Case in the northeast south to the Carib Reserve, and probably is to be found along the whole extent of the windward coast. Often *Rhyticocos* grows at but a stone's throw from the Atlantic surf and from such sites it extends inland along the ridges, as well as in the river-valleys, for a distance of several miles (Fig. 16). Another woody species, large-leaved *Coccoloba venosa*, has a similar distribution in Dominica.

One should not assume from this discussion that the vegetational zones of Dominica have definite and sharp boundaries. Some species of the leeward dry slopes do occur, and commonly, on the windward coastal bluffs. The most outstanding of these is *Tabebuia pallida*, which populates the bluffs along with the common thicket-formers *Chrysobalanus icaco*, *Erithalis fruticosa*, *Coccoloba uvifera*, and numerous other, but less important, shrubby species. On the other hand, genera like *Haematoxylon*, *Parkinsonia*, *Albizzia*, *Calliandra*, and *Bursera* which are so characteristic of dry scrub of the leeward coast are noticeably absent on the windward coast.

The general change in the aspect of the vegetation in passing from the xerophytic formation to the evergreen forest is well marked. I am basing my observations on notes taken along the trail running east from Dublanc village to Milton estate. From the scrub-woodland climax with its primarily microphyllous, dwarf, deciduous, woody vegetation one passes into a forest of increased stature and dominated by macrophyllous evergreen species. Some of these like *Ceiba* and *Hymenaea* are also found on the lower slopes. The majority are new types, many of which are common in the rain forest of the interior. In fact Beard (5) considers this forest to be "rain forest" and "lower montane rain forest" which has been reduced to secondary forest through disturbance by man.

The formation is exceedingly diverse in species including *Pithecellobium jupunba* (Pipiri or Bois cicerou), *Swartzia simplex* (Z'oranger), *Andira inermis* (Angelin), and *Ormosia monosperma* (Caconier) of the Leguminosae; *Licania ternatensis* (Bois diable) of the Rosaceae, *Cedrela odorata* (Acajou) of the Meliaceae, *Myrica splendens* (Petit feuille) of the Myrtaceae, *Daphnopsis caribaea* (Mahaut piment) of the Thymelaeaceae, *Byrsonima spicata* (Bois tan or Moricypre) of the Malpighiaceae, *Calophyllum antillanum* of the Guttiferae, *Ilex cuneifolia* (Petit citron) of the Aquifoliaceae, *Sideroxylon foetidissimum* (Acomat St. Christophe) of the Sapotaceae, *Buchenavia capitata* (Z'Olivier) of the Combretaceae, *Vitex divaricata* (Bois lezard) and *Citharexylum spinosum* (Bois cotlette) of the Verbenaceae, species of *Cordia* of the Boraginaceae, and also numerous representatives of the Melastomaceae particularly species of *Miconia* (Cré-cré).

No longer is there any noticeable lack of a ground-cover for a number of herbaceous species now appear of which the fern, *Blechnum occidentale*, is a dominant. Clambering herbs and vines, also epiphytes, are more frequent and one can find extensive living curtains formed by climbing species of *Ipomoea* and *Tournefortia*, *Scleria scindens*, (Zeb couteau) *Lasiacis divaricata*, and *Blechnum volubile*, while on tree-trunks *Philodendron oxycardium* is common.

The majority of these species are also found populating the windward portion of this transition belt of evergreen forest. With them is

associated the black-trunked *Diospyros ebenaster*—a subdominant on this coast—*Rhus metopium* of the Anacardiaceae, and numerous species of the families Myrtaceae and Myrsinaceae. A species of the coastal thicket, also occurring in this belt is *Amyris elemifera* (Bois chandelle) of the Rutaceae, often seen in association with *Cassia tora*. Herbaceous twiners such as *Momordica charantia* and various others intermingle in the thickets or woodland-borders with the woody *Chiococca alba* and beautiful *Petrea kohautiana* (Fleur de la Fête de Dieu).

One of the showiest of the local orchids, white-flowered *Epidendrum ciliare*, is seen upon stumps or low on tree-trunks on the coastal bluffs; while in the grassy clearings along roadsides appear terrestrial orchids such as *Spiranthes tortilis* and *S. orchioides*. *Pilea microphylla*, *Peperomia pellucida* and *P. tithymaloides* are frequent upon wet rocks while on wet banks is found *Isotoma longiflora* of the Lobeliaceae. Grasses and sedges, too numerous to mention, populate all the roadsides, trails, and clearings.

4. The Rain Forest Formation*

a. *The Rain Forest Proper*

Most luxuriant and extensive of all the forest-formations of Dominica is the tall broad-leaved evergreen rain-forest generally found at altitudes lying roughly between 1,000 and 2,500 feet. Rain forest is the optimal formation in the tropics and nowhere in the American tropics can a better display of it be seen than in the interior of Dominica. This climax originally covered much of the mountainous area between these elevations and extended from the northern slopes of Morne au Diable to the sheer cliff which forms the southern face of Morne Plat Pays. The best natural stands are said to occur in the upper Layou valley, a region of yellow Earth Soils lying south and east of Morne Diablotin, but the formation also is found on favorable sites throughout the areas of Red Earth. Because the land occupied by this formation offers good prospects for peasant-gardens, the forest is often cleared and replaced by cultivations of native crops. After a few years, when the fertility of the soil is depleted it is permitted to be reoccupied by the natural vegetation. Meanwhile the peasant has shifted to a newly cleared plot. The result of this shifting agriculture, so common throughout the American tropics, is the replacement of the original rain forest cover by degraded secondary forests. In spite of the inroads of man Dominica's rain-forests are still the most extensive in the Caribbees. That this island, with over 80 per cent of forest cover, has not been extensively exploited of its timber resources is due entirely to the precipitous terrain which makes logging methods and costs prohibitive. Nevertheless the absence or scarcity of certain of the better timber species indicate that the rain forest has been culled systematically by local wood cutters down through the years.

The luxuriance of the forests of this zone is the result of abundant

*Inclusive of what Beard calls "Lower montane Rain Forest," a less luxuriant formation occurring on soils with poor drainage, especially the Red Earth Soils. Component species of true rain forest and lower montane rain forest are the same for the most part, and so these formations are not treated separately in this account.

rain. Precipitation is at most times heavy and with good distribution throughout the year, averaging from about 175–200 inches annually at Sylvania to over 300 inches in the vicinity of Laudat. Even during the spring months, when the annual drought affects the plant formations at lower elevations, precipitation in the rain-forest belt is still sufficient to maintain proper conditions of moisture. The soils of much of Dominica's rain forest zone are a heavy red earth, underlain over wide areas by an impervious hardpan. The soil is thus mucky with poor drainage and poor aeration. This condition is reflected by the forest trees which possess extensive though shallow root systems.

Trees in the rain forest vary from medium to large. At times 5–10 feet in diameter, the dominants run 90 to 110 feet in height and form a more or less closed canopy. The dominants are usually well-spaced with trunks frequently buttressed at the base; their boles are long-stemmed with the first branch seldom below 50 feet above the ground. Dominant crowns are round or flat while those of dominated trees are pyramidal. When one considers that the majority of these trees possess very insignificant flowers, it is easy to realize the difficulties of locating and collecting the necessary flowering specimens.

Stratification occurs in the rain forest. Besides the primary stratum formed by the dominants there is a discontinuous middle stratum of trees averaging 40 to 80 feet high, a lower stratum of small trees 15 to 40 feet high, and a ground stratum composed of shrubs and herbs. Actually the floor of the forest is quite open, populated here and there in glades by a few shrubby and herbaceous species. The remaining plants to be seen, besides the lianas and creepers, are the seedlings of the forest-trees. Epiphytes are rare at lower levels on the dimly lit boles but are not uncommon high in the canopy where light conditions are more favorable.

The tree communities of the rain forest are several and although the general aspect of the vegetation is homogeneous the composition is a heterogeneous one. For example, on a ten-acre plot of Dominica rain forest examined by Beard 1,542 trees with diameter classes of one foot or more actually were recorded and of this number a total of sixty different species were represented. The writer attempted a rough estimate of the relative proportion of species in rain forest (actually lower montane rain forest) along a trail known locally as the Campbell track, near Sylvania. The soil, underlying the quarter-mile transect along which species of trees were enumerated, was of good quality but shallow, with hardpan below at a depth of 4 or 5 feet. The number of individuals of each species occurring in this particular area is recorded after the names in the following table. Dominant species of the main canopy are so indicated by the letter (D) following the patois name; the remaining species are secondary trees of lower strata.

LIST COUNT OF SPECIES OBSERVED IN RAIN FOREST AT
SYLVANIA, DOMINICA

<i>Scientific Name</i>	<i>Creole Name</i>	<i>Number of Individuals Observed</i>
<i>Tapura antillana</i> (Bois côte).....		31
<i>Dacryodes excelsa</i> (Bois gommier) (D).....		22
<i>Amanoa caribaea</i> (Carapite).....		13
<i>Sterculia caribaea</i> (Mahot cochon).....		13
<i>Licania ternatensis</i> (Bois diable).....		10
<i>Simarouba amara</i> (Bois blanc).....		10
<i>Symplocos martinicensis</i> (Graines bleues).....		8
<i>Sloanea berteriana</i> (Chataignier petit feuille) (D).....		8
<i>Sloanea truncata</i> (Chataignier grande feuille) (D).....		7
<i>Cordia laevigata</i> (Coco poule).....		4
<i>Richeria grandis</i> (Bois bande).....		3
<i>Buchenavia capitata</i> (Z'Olivier).....		2
<i>Miconia guianensis</i> (Bois cré-cré).....		2
<i>Guatteria caribaea</i> (Bois violon).....		2
<i>Pithecellobium jupunba</i> (Bois pipiri).....		2
<i>Phoebe elongata</i> (Laurier de rose).....		1
<i>Hibiscus tulipaeiflorus</i> (Gombo montagne).....		1
<i>Chimarrhis cymosa</i> (Bois rivière).....		1
<i>Swartzia</i> sp. (Z'Oranger).....		1
<i>Cecropia peltata</i> (Bois canon).....		1
<i>Ormosia monosperma</i> (Caconier) (D).....		1
<i>Ocotea cernua</i> (Laurier isabelle).....		1
<i>Sapium caribaeum</i> (La gluie).....		1

Of interest in the preceding table is the presence of only two trees known to the natives as "laurier." Species belonging to this patois classification generally pertain to the Lauraceae (including the genera *Aniba*, *Aydendron*, *Beilschmiedea*, *Endlicheria*, *Nectandra*, *Ocotea*, *Oreodaphne* and *Phoebe*); more than a score of different "lauriers" are recognized by the native woodcutters who consider certain of them among the most highly prized of local timbers. Their poor showing on the list may indicate that these genera have been culled from the forest.

The most conspicuous trees of the rain forest in Dominica are the giant species of *Sloanea* of the Elaeocarpaceae—*S. berteriana* (Chataignier petit feuille), *S. caribaea* (Chataignier petit coco), and *S. truncata* (Chataignier grande feuille)—with mighty, buttressed, reddish trunks (Fig. 17), and *Dacryodes excelsa* (Gommier) of the Burseraceae with smooth pillar-like unbuttressed boles (Fig. 18). These species are the tallest as well as the largest trees of the forest, and communities dominated by them have been described as the *Sloanea-Dacryodes* association. This association is recognized as the only one, typical of the true rain forest in Dominica; as such it occurs throughout the Caribbees wherever rain forest occurs.

Other important species in the canopy layer include *Pouteria semecarpifolia* (Contrevent) and *P. multiflora* (Pain d'épice) of the Sapotaceae, *Chimarrhis cymosa* (Bois rivière) of the Rubiaceae, *Dussia martinicensis* (Pommier) and *Ormosia monosperma* (Caconier rouge) of the Leguminosae, and *Talauma dodecapetala* (Bois pin) of the Magnoliaceae.

Among trees of the mid-stratum in the rain forest are *Tapura antillana* (Bois côte) of the Dichapetalaceae (Fig. 19), *Licania ternatensis*

(Bois diable) of the Rosaceae, *Cordia sulcata* (Bois bré) of the Boraginaceae, *Sterculia caribaea* (Mahot cochon) of the Sterculiaceae, *Simarouba amara* (Bois blanc) of the Simaroubaceae, *Guarea macrophylla* (Bois pistolet rouge) of the Meliaceae, and *Swartzia caribaea* (Z'oranger



- FIG. 17. Chataignier petit feuille (*Sloanea berteriana*) in rain forest near Sylvania.
 FIG. 18. Bois gommier (*Dacryodes excelsa*) on rain forest border at Milton. (Upper right).
 FIG. 19. Common trees of the rain forest near Sylvania. From left to right, chataignier petit feuille (*Sloanea berteriana*), carapite (*Amanoa caribaea*, and bois côte (*Tapura antillana*). (Lower left).
 FIG. 20. *Cephaelis swartzii*, a common shrub of rain forest borders. (Lower right).

blanc) and *Inga ingoides* (Pois doux marron) of the Leguminosae; while prominent among the slender lower-story trees are several species of *Chrysophyllum* (Bouis) of the Sapotaceae, fragrant white-flowered *Faramea occidentalis* (Cafe marron), *Ixora ferrea* (Bois pichette) and *Exostemma sanctae-luciae* (Quina)—all members of the Rubiaceae, also *Marila racemosa* (Cachiman falaise) of the Guttiferae, *Heisteria coccinea* (Bois perdrix) of the Olacaceae, and *Cordia laevigata* (Coco poule) of the Boraginaceae.

Two species of the Guttiferae known as "mang", *Tovamita plumieri* (Mang rouge) and *Moronobea coccinea* (Mang blanc), are also unrepresented in the above list. In some poorly drained localities, particularly at higher elevations (above 2,000 feet—south of Freshwater Lake and at base of Morne Trois Pitons)—these stilt-rooted trees often cover small forest-areas in almost pure stands. Another species much sought after on account of its hard wood which makes the finest charcoal (the standard Dominica fuel) is *Licania ternatensis* (Bois diable). Often this species is locally dominant. On the deep soil of the slopes of Morne Colla Anglais, just west of Sylvania, *Licania* is especially prominent. Again, in mountain-forests bordering on the mesophytic transition—on ridges lying north of La Chaudière (windward side in valley of Hampstead River)—the writer made a rough count over a similar quarter-mile path in order to learn the relative abundance of Bois diable. Of 129 trees entered in the count 37 represented *Licania*, and this in a region where the species was actively utilized in the making of charcoal.

To the species of the main canopy must be added a list of some of the slender under-trees. The most prominent of these are several species of the genus *Chrysophyllum* (Bouis), the fragrant white-flowered *Faramea occidentalis* (Cafe marron), *Ixora ferrea* (Bois pichette or Bois crapaud), *Exostemma sanctae-luciae* (Quina), all members of the Rubiaceae, also *Marila racemosa* (Cachiman falaise), and *Heisteria coccinea* (Bois perdrix).

Palms are not generally prominent in the vegetation of Dominica yet, although no specific mention has been made of them up to now, they are scattered fairly regularly throughout all vegetational zones. *Acrocomia* and *Aiphanes* are primarily genera of the dry coast while *Rhyticocos* is the representative in the secondary evergreen forest communities. My collections in the field have revealed that the two species of understory palms found in the rain forest formations are new to science. One of these strangely enough, is the familiar, tall *Euterpe dominicana* (Manicol or Palmiste), which in some regions (near La Chaudière) is a prominent under-canopy species. Wherever this palm occurs the forest is hygrophytic in nature so *Euterpe dominicana*, might well be called an index species of the rain forest. *Geonoma dominicana* (Yanga), a very slender, low, cane-like palm, of rarer occurrence, is limited generally to steep wet slopes or to moist ravines. In some localities, particularly in out-of-the-way ravines on the lower slopes of Morne Diablotin, *Geonoma* even forms prominent colonies in the dense shade beneath the canopy of the *Dacryodes-Sloanea* association. Each of these rain forest palm genera have equivalent species in the montane zone, discussed below.

Humus is present on the rain forest floor but because the light filtering through the canopy is dim the shrubs and herbaceous species of the

ground-cover communities are not plentiful. Among shrubs often seen are *Heisteria coccinea*, *Stylogyne caniculata*, *Psychotria uliginosa* and *Cephaelis swartzii* (Fig. 20). Colonies of *Selaginella flabellata* (Parasol agouti) and *Dryopteris clypeolulata* along with occasional clumps of *Danaea* and *Lindsaea* comprise the terrestrial pteridophytes. *Hemitelia muricata* is often seen and is the common tree-fern of the shaded forests (as opposed to *Cyathea arborea*, abundant on disturbed land); the caudex of this species generally supports a colony of the filmy fern, *Trichomanes polypodioides*. A few terrestrial orchids occur where light filters through. They represent species of *Pelexia*, *Erythrodos*, *Cranichis*, and *Prescottia*. Among the rarities of the forest floor are endemic *Besleria petiolaris* and the peculiar saprophytes, *Voyria aphylla* of the Gentianaceae, *Wulfschlaegelia aphylla* of the Orchidaceae, and *Gymnosiphon germainii*, *G. sphaerocarpus*, and *Apteria aphylla* of the Burmanniaceae.

Certain of the dominant trees of the rain forest are often heavily laden with masses of lianas, coarse scramblers, and epiphytes. Epiphytes appear in greatest profusion on the branches in the sunlight of the canopy (Fig. 21, 22). From the ground, an observer can hardly recognize the foliage or flowers of any of these species. All that is apparent are the twisted stems of giant vines or the long roots of aerial shrubs or strangler species. One epiphytic or weakly climbing fern of lower levels is *Polytaenium feei*, present with a few shade-loving species of *Elaphoglossum*, *Hymenophyllum* and *Trichomanes* on the great dark boles. The giant basket epiphyte, *Anthurium hookeri*, is common while the scrambling aroids, *Philodendron lingulatum* and *Anthurium palmatum*, and *Carludovica plumieri* of the Cyclanthaceae (Fig. 23), here reach their best development. Only where forest trees have been recently felled by natives who are making new provision gardens can one get an idea of the epiphytes of the canopy. On such fallen trees, ferns (*Cochlidium*, *Vittaria*, *Elaphoglossum*, *Polypodium*), bromeliads (*Aechmea*, *Catopsis*, *Guzmania*, *Vriesia*), and orchids (*Polystachya*, *Epidendrum*, *Stelis*, *Pleurothallis*, *Jacquiniella*, *Elleanthus*, *Lepanthes*, *Maxillaria*, *Oncidium*, and *Dichaea*) constitute the majority in this tree-top epiphytic company. With them are shrubby *Hillia parasitica* with white jasmine-like flowers, rarely *Blakea pulverulenta*, an epiphytic Melastomaceous shrub with attractive flowers. But most common of all are two woody species: *Marcgravia umbellata* is a liana with curious dimorphic leaves; marron-fruited *Clusia plukenetii* (Kaklin) starts as an epiphyte high in the crowns of trees but soon sends down a host of strong roots which reach the ground and in subsequent growth often strangle the host. Many of the dominant trees of the rain forest have individual clusias and in many cases the thick succulent foliage of the epiphyte hides that of the host tree.

On areas with impeded drainage, such as Red Earth and Mountain Podsolc soil, the *Dacryodes-Sloanea* association is replaced by other associations discussed by Beard as constituents of his "Lower Montane Rain Forest Formation." The *Licania-Oxythece* association is the most typical community and in its most characteristic form occurs on the windward coast at lower elevations where rainfall is less than in the interior. *Licania ternatensis* (Bois diable), a species much sought after

on account of its hard wood, which makes the finest charcoal (the standard Dominica kitchen fuel), is the principal dominant but has a common associate in *Oxythece pallida* (Balate). In moister areas in the interior *Amanoa caribaea* (Carapite) becomes co-dominant. The genera *Dacryodes* and *Sloanea* are often present but not as dominants. *Licania* is prominent on the slopes of Morne Colla Anglais near Sylvania as well as on ridges bordering the Hampstead River valley on the windward coast.

Curious and highly specialized is the sub-climax community of the rain forest (and montane) zone in which a species of *mangle* ("mangrove") dominates. This is not to be confused with the coastal community of true mangroves (*Rhizophora*, etc.) absent in Dominica though common throughout the Caribbean region—but resembles it superficially not only in its occupancy of poorly drained soils but also in the presence of species producing an abundance of aerial prop roots. *Symphonia globulifera* (Mangle blanc) is generally gregarious (forming 75 per cent of the trees, according to Beard) but usually associated with *Amanoa caribaea*, *Euterpe dominicana* (Palmiste), and *Tovomita plumieri* (Mangle rouge).

b. Seral Vegetation of Rain Forest Areas

In the zone of rain forest are clearings, pasturelands, or other open lands made either by man or by natural forces (Fig. 24). All these possess species of a sun-loving or weedy nature representing the seral stages leading to the climax rain forest formation. The *Symphonia* community described above should also be considered as seral.

The communities of forest-borders and the banks of the numerous streams (Fig. 25) are similar in composition for in each of these habitats additional sunlight favors the growth of many more species. Herbs, shrubs, and smaller trees are here more abundant than in the rain forest. Common species of trees of such areas are *Inga laurina* (Pois doux) and *I. ingoides* (Pois doux marron) *Swartzia simplex* (Zorangier noir), *Dussia martinicensis* (Pommier), and *Hirtella triandra* (Zicaque). *Sterculia caribaea*, *Simarouba amara*, *Cecropia peltata*, and *Chimarrhis cymosa* often are more abundant in such sites than within the rain forest. The Melastomaceae (many of whose arborescent genera are known as Cré-cré) are represented by the species of *Miconia* already mentioned, as well as by *M. furfuracea*, *M. striata*, *M. tetrandra*, *M. trichotoma*, *Graffenrieda latifolia*, *Conostegia calyptata* and *C. icosandra*, and *Charianthus corymbosus*. *Bunchosia nitida* of the Malphigiaceae and various species of the Lauraceae are frequent.

Beneath these trees, as well as in ravine-bottoms and along stream banks, one finds a number of shrubby species such as *Piper dilatatum* and *P. aequale* (both known as Doctor bush), *Clidemia umbrosa*, *Boehmeria ramiflora*, and *Phyllanthus mimosoides*. Woodland borders possess three species of especial widespread occurrence—white, spicate *Gonzalagunia hirsuta*, *Palicourea crocea*, with bright yellow flowers on crimson pedicels, both of the Rubiaceae; also magenta-flowered *Odontonema nitidum* of the Acanthaceae.

Along the moist stream banks herbaceous types become very numerous. Species of *Pilea* (*P. semidentata*, *P. inaequalis*, and *P. microphylla*)

occur on mossy rocks beside the streams as well as *Phenax vulgaris*, *Sauvagesia erecta*, and *Trichomanes membranaceum*. In similar situations one commonly finds the ferns, *Dryopteris sancta* and *D. consanguinea*. The showiest species on wet banks is a gesneriad, pink-flowered



FIG. 21. Epiphytes of the rain forest on a bois cotlette tree (*Citharexylon fruticosum*) at Lisdara. (Upper left).

FIG. 22. Epiphytes on a bois cotlette tree include bromeliads (*Vriesia ringens*), ferns (*Elaphoglossum petiolatum*), and orchids (*Pleurothallis*, *Stelis*).

FIG. 23. Zelle mouches (*Carludovica plumieri*) a common scandent epiphyte of the rain forest zone. (Lower left).

FIG. 24. A natural clearing near the Roseau Valley waterfalls with the common tree fern, *Cyathea arborea*, in the foreground. (Lower right).

Episcia melittifolia. *Begonia dominicalis* is also common. Usually in deeper shade are met the large (6 feet or more tall) terrestrial ferns, *Anisosorus hirsutus*, *Hemidictyum marginatum*, *Dryopteris rotundata*, *Saccoloma domingense* and *S. inaequale*; also smaller species of the genera *Adiantum*, *Lindsaea* and *Dryopteris*. Epiphytic ferns (*Polypodium tenuiculium*, *P. asplenifolium*, *P. jubaeforme*, *P. mollissimum*, *P. pectinatum*, *P. brasiliense*, *P. chnoodes*, *P. phyllitidis*, *P. crassifolium*, *Nephrolepis rivularis*, *Hymenophyllum polyanthos*, *H. hirsutum*, *Trichomanes hymenophylloides*, *T. pusillum*), peperomias (especially *Peperomia rotundata* and *P. emarginella*), and orchids (particularly *Epidendrum*) cover the limbs of the trees. Pendent, succulent-leaved *Psychotria crassa* and beautiful red-bracted, yellow-flowered *Alloplectus cristatus* are also found in epiphytic situations. Balisiers (*Heliconia bihai* and *H. caribaea*) are common in sunnier areas and wherever the ravines are so steep that trees cannot grow, the heliconias become almost pendent and gregarious associating with species of *Carludovica* (Zelle-mouches).

Under the "slash-and-burn" system of peasant subsistence agriculture the soils of the rain forest zone favor the growth of bananas as well as the staple root-crops, dasheen (*Colocasia*) and tannia (*Xanthosoma*)—but only for a few years on any one plot (Fig. 26). After that time the soil fertility is exhausted and the garden has to be shifted to a virgin plot of land. Old gardens, abandoned in this fashion, are quickly recaptured by rank vegetation, which forms an impenetrable jungle growth. General observations show that a given piece of abandoned garden-land will be occupied successively by different seral communities until eventually the climax rain forest is re-established. Weedy grasses, sedges, and wind-distributed composites appear first on such land, usually while it is still under cultivation. Of the Compositae, *Emilia sonchifolia*, *Ageratum conyzoides*, *Synedrella nodiflora* and *Erechtites valerianaeifolia* are most abundant but are soon joined by *Hyptis atorubens* and species of *Stachytarpheta*. The majority of the pasturelands and orchard areas possess this static community. Such lands are also populated by *Bidens pilosa*, species of *Desmodium* and *Alternanthera*, *Oxalis martiana*, and *Polygala paniculata*. If the area is meadowland, one may expect pink- or white-flowered *Pterolepis glomerata* and *Nepsera aquatica* of the Melastomaceae, *Scoparia dulcis*, and *Aeschynomene sensitiva*. Weedy *Psidium guajava* or *Lantana camara* also make an early appearance. But if such areas are not kept under continual cultivation or are not pastured, succession proceeds with the growth of taller sprawling annuals like *Phytolacca* and *Wulffia*. Herbaceous twiners of the genera *Ipomoea*, *Mikania* and *Dioscorea* soon establish a wild, rank aspect. Such growth is impenetrable particularly if high-climbing species of *Scleria* (Razorglass) become established. If the slopes are at all open two species of ferns, *Dicranopteris bifida* and *Cyathea arborea* soon establish themselves. The former is a common pioneer with *Pityrogramma calomelanos* (Gold Fern) and *Lycopodium cernuum* (Staghorn) on recent road-cuts or landslides. *Cyathea arborea*, the commonest tree fern, dominates abandoned sunny slopes and in many places forms extensive and beautiful colonies, whereas the common tree fern of the forests, *Hemitelia grandifolia*, is not found under such conditions. The soils occupied by *Cyathea* are said to be generally deficient in nitrogen.

The first really woody species to appear with succession are usually members of the Melastomaceae—individual plants of *Miconia guianensis*, *M. furfuracea*, and *Chorizanthe corymbosa*. All of these have baccate fruits and, with rapid local distribution by birds, are tropical substitutes for the temperate weedy species of *Prunus*. Despised by the peasants is *Miconia guianensis* which soon crowds out the ferns mentioned above substituting an almost pure stand of worthless secondary forest. As this secondary forest (Fig. 27) becomes infiltrated with pioneering forest species such as *Pithecellobium jupunba*, *Sapium caribaeum*, *Symplocos martinicensis*, *Cecropia peltata* (Bois canon), *Inga* spp., *Simarouba amara*, *Sterculia caribaea*, and *Chimarrhis cymosa*, the climax rain forest formation again becomes dominant. Just how long a period is needed to complete such a successional cycle running from cleared land to mature forest remains to be learned. It is interesting to note that areas, which are known to have been planted to coffee more than a century ago (on the hills above Brigandy flats just south of Sylvania; and on the plateau about Milton), are now occupied by seemingly old stands of rain forest.

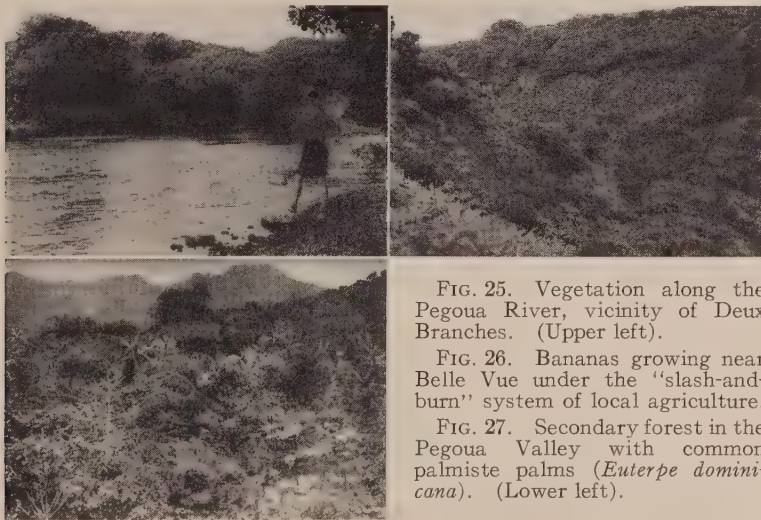


FIG. 25. Vegetation along the Pegoua River, vicinity of Deux Branches. (Upper left).

FIG. 26. Bananas growing near Belle Vue under the "slash-and-burn" system of local agriculture.

FIG. 27. Secondary forest in the Pegoua Valley with common palmiste palms (*Euterpe dominicana*). (Lower left).

5. Montane Formations

There is no clear line of demarcation between the rain forest formations of middle elevations and the montane formations which occupy the higher elevations in Dominica. In fact many of the species and even one or more of the plant communities of the rain forests may be shared in the zone of transition existing between these formations.

Wherever the land begins to rise to form one of the main peaks, or where intermont ridges or plateaux are exposed to continuous wind action, the forests lose stature and ultimately become dwarfed to such a state that at or near the actual summits the component species average only 10–20 feet high. In the ascent from the rain forest to the summit of one of the major peaks one can recognize two principal montane formations, brief descriptions of which follow.

a. *Montane Thicket*

In nature this formation is limited to the exposed mountain ridges or summits of the lesser peaks (viz., Morne Colla Anglais, Morne Concorde, Morne Couronne, etc.) and since such sites have a very irregular distribution based on physiography it can be seen that the boundaries of montane thicket are difficult to define. The slopes it occupies are firm and composed of Red Earth, Podsol, or rocky soil. Beard (5) describes the physiognomy of the formation in its typical aspect as . . . "a dense pole—thicket 40–50 ft. in height, the trees very thin and spindly with tiny crowns. At the rate of about one per acre, there are scattered large gnarled and bent trees 6–10 ft. in girth, always of the same species, *Cyrilla racemiflora* (Bois rouge). None of the trees have stilt roots except *Tovomita*. Trunks are mossy but free from lianas and epiphytes, and there is remarkably little shrubby and ground vegetation."

Dominant trees of the Montane thicket form the *Podocarpus-Richeria* association in which the species are *Podocarpus coriaceus* (Raisinier montagne or Resolu montagne), the sole native species of gymnosperm in Dominica, and *Richeria grandis* (Bois bandé). Other prominent trees include *Byrsonima martinicensis* (Mauricif), *Tovomita plumieri*, *Ilex macfadyeni* ('Ti citron'), *Pisonia fragrans* (Mapou), *Licania ternatensis*, and *Oxythece pallida*. *Cyathea imrayana*, a woodland tree-fern whose caudex is armed with formidable spines, is occasional throughout this region. An infiltration of some species from the next higher formation is also apparent while the increasing rainfall is reflected in the presence on the wet forest floor of certain large filmy ferns such as *Trichomanes rigidum*, *T. trigonum*, and *T. elegans*.

A swamp phase of Montane thicket occurring on soils with poor drainage, has been described as "carapite forest" (5) in which *Amanoa caribaea* assumes dominancy. "Carapite forest" may be said to be to the Montane thicket formation what "Mangle Forest" is to the Rain forest. Since the conditions supporting them are purely edaphic these forest phases might better be considered as seral communities.

b. *Elfin Woodland*

On the summits and upper slopes of the higher mountains in Dominica grows a low impenetrable thicket-like forest (Fig. 5). The leaves, oblique branches and gnarled trunks of the trees in this zone are so covered with epiphyllous hepatics and dripping mats of moss that the formation is known in one form or another pantropically as Elfin Woodland, Cloud Forest, or Mossy Forest. Where it occurs on more sheltered slopes Elfin Woodland is not difficult to traverse but where it is found on the higher ridges and crests the formation is so impenetrable that passage through it is well nigh impossible unless a trail has been previously cut.

Climate influences the Elfin Woodland in three ways, the combination of which has had much to do in shaping its peculiarities. One climatic factor is temperature, which is much reduced (probably averaging between 60–65° F.) throughout the formation. A second factor is wind for the strong easterly trades blow steadily across the ridges and summits profoundly influencing the physiognomy of the forest, giving it a windshorn, flat-topped appearance. The coriaceous and often thick

foliage of many of the trees suggests that there may be occasional physiological drought but this is difficult to believe in an area receiving such constant rain. The third factor is precipitation and/or condensation which, in the zone of Elfin Woodland is the heaviest on the island. Near Lakeside (at the Freshwater Lake) as much as 350 inches of rain have been recorded in a single year and this locality, although not below the cloud belt, is situated well below true Elfin Woodland. It is quite possible that the summits of exposed peaks like Diablotin, Trois Pitons, and Watt average at least 400 inches of rain per year, for the cooling of



- FIG. 28. General aspect of elfin woodland at summit of Morne Trois Pitons. Genera visible in the canopy include *Clusia*, *Didymopanax*, *Weinmannia*, *Euterpe*, *Hibiscus*, and *Cecropia*. (Upper left).
 FIG. 29. Interior aspect of elfin woodland on Morne Anglais showing abundance of mosses and vascular epiphytes. (Upper right).
 FIG. 30. Kaklin (*Clusia venosa*) and palmiste montagne (*Euterpe globosa*), conspicuous species of elfin woodland on Morne Trois Pitons. (Lower left).
 FIG. 31. Herbaceous vegetation on a basaltic outcrop at the summit of Morne Trois Pitons. The dominant plants are bromeliads, especially *Pitcairnia spicata* var. *sulphurea*, but other genera include *Blechnum*, *Lycopodium*, and *Tibouchina*. The slopes immediately beyond are occupied completely by elfin woodland. (Lower right).

the air-currents forced upwards over their summits results in the formation of constant mists and clouds from which condensation or precipitation is practically incessant. The atmosphere of the Elfin Woodland is therefore almost completely and continuously saturated; the trees drip with moisture and the thin soil beneath is waterlogged, and often boggy.

The mountain summit flora is perhaps more interesting than that of any other vegetational region in Dominica. Because of the relative inaccessibility of the mountain peaks plant collections on them have been few. In fact the summits of Diablotin and Morne Watt have never been fully explored botanically. Probably more endemics and species of

restricted range are found in the Elfin Woodland than in any other of the local plant formations. The dwarfed trees are numerous, forming a tight canopy, in which the crowns are sometimes so closely intertwined that it is almost possible to crawl over the top of the canopy itself (Fig. 28). The trees attain a height of ten to twenty feet but average less than a foot in diameter. They are often without a definite trunk and thus resemble shrubs in their general growth habit. Leaves are limited to the branched tips leaving the barren limbs to festooning bryophytes or vascular epiphytes (Fig. 29). Because of the shallow soil, roots are often partly bare, giving a stilt-like appearance. The ground cover, except for spots beneath openings in the canopy, is limited to herbs. At the lower limit of Elfin Woodland, bordering on Montane thicket where wind action is not so severe, the trees are much taller than at the mountain summits. The forest here is also more open although the trunks are still crooked, irregular, branched, and covered with epiphytes.

The dominant tree of the Elfin Woodland is *Clusia venosa* (Kaklin), which, unlike its epiphytic strangler relation, *C. plukenetii* of the rain forest, is free-living, forming sizeable colonies or patches scattered among the other woodland species (Fig. 30). The remaining character species of the tree stratum are fairly evenly distributed. They include *Charianthus purpureus* var. *rugosus*, species of *Miconia* including *Miconia coriacea* and *M. vulcanica*; *Didymopanax attenuatum* of the Araliaceae, *Weinmannia pinnata* of the austral Cunoniaceae, *Hibiscus tulipaeiflorus* (Gumbo montagne), *Hedyosmum arborescens*, *Cyrilla arborescens*, *Freziera undulata*, *Guettarda crispiflora*, *Ilex sideroxyloides* and *I. nitida*, *Calolisianthus frigidus*, and species of *Ardisia*, *Grammadenia*, *Rapanea*, *Rondeletia*, and *Ternstroemia* (Fig. 28). Two montane palms are present. The common palm of the Elfin Woodland, *Euterpe globosa* (Fig. 30), is widely scattered throughout the zone while *Geonoma hodgeorum* is infrequent and known only from the summits of Morne Trois Pitons and Diablotin. The shrub *Cephaelis swartzii* of the rain forest zone also is found in the Elfin Woodland, and is here joined by *C. axillaris* which is apparently limited to higher elevations. With these are associated *Lobelia stricta*, *Besleria filipes*, and *Clibadium erosum*.

Except at lower levels in this forest, shrubs are for the most part uncommon due to the tight canopy, and the ground is usually occupied instead by herbaceous species. Species of vines are few but at least two are familiar—a thicket-forming bamboo, *Arthrostylidium excelsum*, and *Mikania hookeriana*.

Terrestrial plants, especially ferns, appear wherever the canopy is broken. Of the larger pteridophytes *Dryopteris decussata* and the rarer *D. rustica* as well as several species of *Blechnum* are often seen, while smaller forms include *Selaginella substipitata*, *Lindsaea montana*, and the three terrestrial species of *Trichomanes* already mentioned as occurring in the Montane Thicket. *Renealmia racemosa*, *Heliconia bihai*, and species of *Anthurium* (*A. dominicense* and *A. grandifolium*) are the largest of the herbaceous types but species of *Pilea* are more common. The presence of a tall violet, *Viola stipularis*, reminds one of the more temperate nature of this woodland.

Aside from the trees the most typical plants of the Elfin Woodland

are the epiphytes, which are often abundant. Among the ligneous types are *Hornemannia racemosa*, *Psychotria pendula*, and *Urceolaria exotica*. Growing in the wet mats of mosses* are many herbaceous types such as the peculiar bladderwort *Utricularia alpina*, numerous species of *Peperomia* and the orchids, *Brachionidium sherringii*, *Malaxis spicata*, and *Epidendrum pallidiflorum*. Epiphytic ferns are represented by species of *Hymenophyllum* (including rare *H. latifrons*, also *H. polyanthos* and *H. hirsutum*), *Trichomanes* (*T. hymenophylloides*, *T. alatum*, *T. rigidum*), and *Polypodium* (*P. duale*, *P. asplenifolium*, *P. jubaeforme*, *P. tenuicolum*, *P. serricula*; rare *P. taenifolium*, *P. hartii*, *P. flabelliforme*, and *P. limbatum*; also a new species, *P. knowltoniorum*). Epiphytic bromeliads are common in numbers if not in species. The giant of them all is *Glomeropitcairnia penduliflora* with scapes up to 10 feet in height; most frequent is *Guzmania plumieri* (the leaf-whorls of which take on a dull reddish color when the plants grow at the exposed summits), while plants of *G. megastachya* are also present.

At the summits of the higher peaks (viz., Morne Trois Pitons, Morne Anglais, and probably also Diablotin) one often finds several square rods bare of arborescent vegetation (Fig. 31). Here the basaltic rock of the lava domes lies at the surface and so offers insufficient soil for larger plants. As one might expect such spots are preempted by pioneering herbs including mosses, lycopods (*Lycopodium meridionale*), ferns (*Blechnum striatum*), and phanerogams such as the bromeliads, *Guzmania plumieri*, *G. megastachya*, and *Pitcairnia spicata* var. *sulphurea*. The last named is frequently the dominant species. The only woody species to be found is a dwarf shrubby melastome, *Tibouchina cistoides* with beautiful purple flowers.

These tiny treeless spots capping certain of the Lesser Antillean peaks have been described incorrectly as examples of *páramo*, a similarly humid vegetational zone lying above timberline in the high Andes of Venezuela, Colombia, and Ecuador. The difference lies in the fact that true *páramo* is a climatic formation and is not met with within the American tropics at elevations of less than approximately ten thousand feet. Furthermore *páramo* communities are highly specialized both as to flora and physiognomy. The highest peaks of the Caribbean islands are under five thousand feet and so nowhere near approach an elevation which would produce a true timberline. Nor are the plant communities specialized but are rather typical species of the Elfin Woodland. Lack of trees on certain areas at the summits of Lesser Antillean mountains is due to edaphic conditions and plant communities occupying such areas should be considered as secondary (seral) and not primary (climatic).

c. Seral Vegetation of the Montane Area

One of seral communities has just been described. Several others also deserve at least brief mention. All these secondary communities have been developed through the interference of certain natural factors and not by man whose influence in the montane zone is non-existent.

Palm Brake is considered by Beard (5) to be a seral community on

*Representing such species as *Isodrepanium lentulum*, *Leucoloma albulum*, *Phyllogonium fulgens*, *Pirella filicina*, and *Rhacocarpus humboldtii*, as well as hepatics like *Herberta juniperina* and species of the genus *Plagiophila*.

steep windward slopes and ridge tops which would normally support Montane Thicket or Elfin Woodland. The dominant character species is the palm, *Euterpe globosa*, which in certain of the Lesser Antilles and especially in the Luquillo Mountains of Puerto Rico forms almost pure groves averaging two-thirds of the cover. This is hardly true on Dominica where *Euterpe* occurs generally as a species rather evenly scattered throughout the Elfin Woodland formation and infiltrating the Montane Thicket below but never in pure stands. The present writer would substitute Montane Thicket and Elfin Woodland for the area marked Palm Brake on Beard's vegetation map of Dominica (5).



FIG. 32. The Freshwater Lake near Laudat. (Upper left).

FIG. 33. Vegetational zonation on the margin of the Freshwater Lake with water hyacinth (*Eichhornia crassipes*) and sedges (*Eleocharis* spp.). Balisiers (*Heliconia* spp.) and gombo montagne (*Hibiscus tulipaeflorus*) are recognizable in the surrounding montane thickets. (Upper right).

FIG. 34. The Boiling Lake. (Lower left).

FIG. 35. Fumaroles in the Valley of Desolation, Grande Soufrière. The plants visible are *Pitcairnia spicata* var. *sulphurea*. (Lower right).

Two bodies of fresh water, the Freshwater Lake (2,365 ft. elevation) (Fig. 32) and the Boery Lake (2,500 ft. elevation approximately), occur on the island of Dominica. Both lie east of Laudat on the southern flanks of Morne Micotrin, the Lake Mountain. Each one is small, at most scarcely a quarter of a mile across; each one occupies what perhaps is a senescent volcanic crater. The writer has not visited the less accessible Boery Lake but according to all the reports of individuals who are familiar with it the waters are devoid of hydrophytes and the rocky margin is bordered by montane thicket. Quite the opposite state exists at the Freshwater Lake where vegetation is abundant and with marginal zonation (Fig. 33). Underwater sulphur-springs are said to empty into this lake (there are several nearby in and around Laudat) and if this is

true it may account for the lack of submerged aquatics. Extending farthest into the open waters is a floating zone of *Eichhornia crassipes* (Water hyacinth). The zone of *Eichhornia* is bordered on its inner margin by extensive colonies of *Eleocharis*, smaller *E. maculosa* (which frequently grows in a semi-submerged state) and the larger *E. interstincta*, the commonest sedge of the lake border. The vegetation of solid ground is a mixture which includes species of *Dryopteris*, *Blechnum*, *Scleria*, *Nepsera*, *Setaria*, *Wulffia*, etc. Heliconias and trees of the montane formations make a sharp boundary beyond.

Also lying within the montane zone is the inaccessible area known as the Grande Soufrière, where can be seen the largest display of fumaroles ("Soufrières") together with the results of their activity upon the surrounding montane vegetation. Here on the floor of a large basin formed by easterly ridges of Morne Watt, Morne Nicholls, and the Grande Soufrière Hills is an extensive series of fumaroles culminating in Dominica's famed Boiling Lake (Fig. 34), a large geyserlike crater perhaps 150 feet across, whose water simmers and boils throwing off continually dense clouds of dangerous vapour. The combined sulphurous fumes of all the vents and fumaroles have had a blighting effect far up the slopes, wherever they have come against the vegetation. The end result has been the formation of what is known locally as the "Valley of Desolation." Along the ridges above lies Elfin Woodland but in the valley only patches of it remain and in these *Clusia venosa* and an *Ilex* seem best able to tolerate the noxious gases. In the proximity of the fumaroles vegetation is absent or sparse and, except for the colorful algae to be seen in the warm water of the streams, is apparently unable either to tolerate the noxious fumes or to root in the mineral-impregnated soil (Fig. 35). The only pioneer species observed close to the vents were the bromeliad, *Pilcainria spicata* var. *sulphurea*, a grass, *Ischaemum latifolium*, and occasional plants of *Dicranopteris bifida*.

ANALYTICAL KEY TO THE PRINCIPAL PLANT COMMUNITIES OF DOMINICA*

1. Tree growth over 10 meters high.
 2. Deciduous trees present (*Seasonal forests*)
 3. Tree strata 3, under $\frac{1}{3}$ of the individuals in the topmost story deciduous.....*Evergreen seasonal forest*
 3. Tree strata 2, over $\frac{1}{3}$ of the individuals in the topmost story deciduous.....*Deciduous* (or semi-deciduous) *seasonal forest*
 2. Forest entirely evergreen:
 4. Tall non-inundated forest with large trees forming a continuous canopy 20 meters or more above ground (*Rain Forests*)
 5. Tree strata 3 or 4, dominants 40 meters or more tall, leaves predominantly compound.....*Optimal rain forest*
 5. Tree strata 2, dominants 30 meters or less tall, leaves predominantly simple:
 6. Dominants about 30 meters tall....*Lower montane rain forest*
 6. Dominants about 20 meters tall; abundant moss and tree-ferns.....*Montane rain forest*
 4. Lower forest, inundated with fresh water.....*Swamp forest*
1. Tree growth 10 meters or less high.
 7. Xerophytic woodland composed of microphyllous, often thorny trees.....*Scrub woodland*
 7. Non xerophytic woodland with thorny species few or absent:
 8. Windswept seashore community with few epiphytes...*Littoral woodland*
 8. Windswept mountain top community with abundant epiphytes and conspicuous palms.....*Elfin woodland*

*Adapted from (3).

BOTANICAL EXPLORATION IN DOMINICA

Domin (11) has published notes concerning the men who are known to have collected plants in Dominica and some of these persons have been discussed by Urban (54). That which follows may be considered an amplification of Domin's account together with additions, particularly of more recent collectors. It will be noted that with the exception of John Inray all collectors have been visitors. It is sad to relate that despite the wonderful flora so readily available and so in need of study through intensive collecting, in recent time scarcely a single resident of this little isle has seen fit to delve into the study of the local plants as an avocation. Primarily because of this lack of local interest Dominica, historically speaking one of the earliest known of the Antilles, remains botanically speaking one of the least known.

Until the last decade or two no intensive floristic studies or collections had been made of Dominica's flora except as noted above. The earliest accounts of the island published in the eighteenth century were largely generalizations on the economic plants or on the vegetation, such as the descriptions contained in the works by *Labat* (39) and *Atwood* (2). The first herbarium records of Dominica species were those of *Swartz* (52) who includes a total of fifteen species collected by Dr. *Alexander Anderson*, *J. Gregg*, and *de Porthieu*.

In 1940, in one of the relic cases of the library of the Gray Herbarium, I stumbled upon a 24-page holographic list of *Frederick Pursh* entitled, "A List of Plants observed at or in the vicinity of Permansio in the Island of Dominica" (Fig. 36). This catalogue enumerates alphabetically but without descriptive data nearly 900 species of plants, native as well as cultivated, observed in Dominica by Pursh during the winter of 1810-1811 while on a sojourn in the Lesser Antilles (St. Barthelemy, Guadeloupe, Dominica, Martinique, and Barbados) for purposes of regaining his health. Although unpublished this manuscript list is the first detailed record of Dominica plants including as it does in three column tabular form the "Botanical Names," a list of "English or Provincial Names" (when known), as well as corresponding "Places of Growth." From the title one would infer that Pursh had not made herbarium specimens to go with the plants "observed" by him and this is borne out by the fact that no specimens of his have been found bearing Dominica localities. However a memorandum, in an unknown hand, inserted in the pages of the holograph states that "two sheets of mounted plants go with this ms. . . . the specimens were scattered through the sheets." I have been unable to locate these sheets as has Ewan (15).

Some eighteen Dominica place names are given by Pursh on his list and the majority of these are still familiar today. Among them are Roseau, "the Savannah" (Grand Savanna), "Callihout" (Coulhout), Barbers Block (just South of Pointe Ronde), "Hispaniole River" (Spanish River, between Barbers Block and Pointe Ronde), Pointe Ronde, Indian River (or Picard River), and the Cabrits. It is apparent that Pursh's travels on this rugged island were rather limited but this is to be expected of one apparently recuperating from ill health. Permansio, the place name evoking the most interest, has not been located with certainty. However, many of Pursh's observations were made within the area lying between Coulhout and Pointe Ronde and I suspect

Permansio was a small coffee estate (coffee was an important local crop at the time) lying in the valley of the Coulihout River, situated due west

List of Plants observed at or in the vicinity of Permanico in the Island of Dominica		
Botanical Names	English or Provincial Names	Places of growth
<i>Abies speciosa</i> L.	Wild-Liquorice	Frequent in hedges, stony ground
<i>Acalypha</i> L. spec. New		Along the sea-shore.
<i>Acer saccharinum</i> L.	Sugar maple	Cultivated.
<i>Achimenes, cupreus</i> W.		Mountain.
<i>Adansia digitata</i> L.	Fig-o-Dile	Cult.
<i>melanocarpa</i> W.	Black apple	On the ridge below the Negro houses.
<i>acida</i> W.	Bully Tree	Mountain woods. Frequent
<i>Aerostichum aureum</i> L.	gunn of ferns	In the swamps near Prince Rupert
<i>sulphureum</i> W.		Mountain woods.
<i>spirale</i> W.		Parasitic on old trees, near the Canada
<i>Marantae</i> L.		shady rocks.
<i>terrifolium</i> W.		Climbing on trees.
<i>lentifolium</i> W.		Do. in dark shady woods.
<i>marginalum</i> L.		Common in mountain woods.
<i>Adenocaulon digitata</i> L.	Yoroid tree of Egypt	Cult.
<i>Adenanthum pavonia</i> L.	Corall-beam	Do.
<i>Adiantum caudatum</i> L.		In shady woods. Frequent
<i>montanum</i> L.		Do. Do. rare.
<i>digitata</i> W.		Do. rare.
<i>Agave, martinicensis</i> L.	Goats meat.	Frequent among bushes.
<i>Agave, virens grandiflora</i> L.		Cult.
<i>sensitiva</i> W.		In swamps, about Prince Rupert &c.
<i>Agave, parva</i> L.	Yellow horse-Rennet.	Cult.
<i>Agaricus</i> L.	All genus of Mushrooms or Fungi.	several species.
<i>Agave, americana</i> L.	Great American Aloe.	Along the sea shore, common.
<i>tuberosa</i> L.	Green Aloe.	Cult.
<i>viriparva</i> L.	Polyporous To.	Do.
<i>Agrostis conyzoides</i> L.		Grown among the Coffee
<i>Agrostis Chlora</i> L.	several species of	grasses, not yet examined.
<i>Aletris hyanthoides</i> L.		Cult. Chinese fishing-line-plant.
<i>Aleurites triloba</i> L.	Stirion-nut.	Cult.
<i>Allamanda cathartica</i> L.		Do.
<i>Allium cepa</i> L.	Onion.	Do.
<i>portum</i> L.	Leeks.	Do.
<i>macrocarpum</i> L.	Onions.	Do. The most common
<i>sativum</i> L.	Garlic.	Do. What do well, without
<i>stolon</i> L.	Shallots.	Do.

FIG. 36. Title page of a holographic list of plants observed in Dominica by Frederick Pursh. The original manuscript is in the library of the Gray Herbarium.

of Morne Diablotin. In support of this guess I quote two entries in the holograph. One of these describes the "place of growth" of *Cleome spinosa* as "Among the coffee at Permansio;" the other observes that *Crateva* (? sp.) *gynandra* occurs "Near Callihout R. (River? or E) at Permansio."

John Imray, a native of Scotland, but for 43 years a resident physician in Dominica, was the pioneer collector in Dominica. Imray's plants served as the sole basis for all records appearing in Grisebach's flora (17) where 662 species from the island are listed. Besides aiding in the preparation of that pioneer flora Imray also kept up active correspondence with contemporary botanists at Kew. His interest in the economic aspects of local plants is shown in his publication on the "Useful Woods" (35) as well as his pioneer efforts in the development of the lime industry in Dominica (55).

In 1841 *Hoskin*, and during the period 1850–1868 *Finlay*, both made casual collections on the island.

Heinrich Alexander Baron von Eggers, who was in Dominica in the years 1880–1883 was, after Imray, the island's most important collector of the nineteenth century. Records for Dominica plants, based on his specimens were published by Urban and also by Krug in his enumeration of pteridophytes, but many Eggers plants are still unreported. Eggers published a paper in Danish on his travels in Dominica (14) and an abstract of this is quoted by Domin (11).

About the same time Dominica received visits from two well-known German botanists, *A. F. W. Schimper* visiting the island on two occasions (1881 and 1883) and *Friedrich Johow* during the winter of 1882–1883. Although these workers apparently did not make any collections of note they did publish valuable ecological-anatomical accounts (36, 37, 44) based on observations made during their visits.

Antoine Duss, author of a pioneer flora of the French Antilles (12) visited Dominica in 1883 and again in 1885. The extent of his collecting activity on the island is unknown but certain of his Dominica specimens are cited by Urban and a few sheets of Duss specimens have been seen by me. Duss' flora, just mentioned, also refers occasionally to species seen by him on Dominica.

Henry Alfred Alford Nicholls went to Dominica from England in 1873 as a young physician and remained until his death in 1926. Like Imray he was much interested in promoting tropical agriculture and published a well-known handbook on the subject. He also appreciated the local flora and beginning in 1886 collected native plants, a number of which were forwarded to Kew.

Towards the end of the nineteenth century there was shown considerable interest in the natural history of the British West Indies. Much of this was due to the promotion of the West Indian Committee, whose several reports tell of botanical collecting in Dominica. For example, *G. A. Ramage* in 1888–1889 made a collection of 394 species and at the same time appears to have been the first botanist to ascend Morne Diablotin, Dominica's highest peak; *J. J. Walsh*, while botanizing in the Caribbees in 1889 made a small collection on Dominica; while *William R. Elliott*, for a time Curator of the Botanic Station in Grenada, made the first collections of cryptogams in Dominica in 1892, 1894,

and parts of the years 1895 and 1896. Elliott's collections were reported upon by Spruce (47) and Smith (46).

The establishment of a Botanic Garden in Dominica around 1889 also stimulated some interest in the local flora if only through the several curators who have held office since that time. These include *Joseph Jones* whose tenure encompassed the years 1892-1924, and *F. G. Harcourt* who succeeded him. *Daniel Morris* (in 1890) and *Charles Alfred Barber* (in 1891) while on official visits of inspection made small collections of Dominica plants.

The first quarter of the present century witnessed little botanical exploration in Dominica though by far the most important was that of *Francis E. Lloyd* who visited the island in 1903 on behalf of the New York Botanical Garden. Lloyd visited many interior points and was the second botanist to ascend Morne Diablotin. His collections remain for the most part unreported. After Lloyd small collections were made by *W. C. Fishlock* in 1915, by *Gerrit S. Miller*, by *A. S. Hitchcock* (grasses), by *Miss Wakefield* (mostly pteridophytes) in 1920, and by *L. H. Bailey* in 1922.

The second quarter of the present century has seen the prosecution of botanical field work which is resulting finally in a rather thorough inventory of the flora of Dominica. The field work of *Karel Domin* in 1926 and subsequent herbarium research on the pteridophytes have given us a valuable contribution (11) already commented upon. In 1932 *David Fairchild* made casual collections and these were followed in 1933 by those of *G. Proctor Cooper* who spent a few months on the island as a part of a lengthy Caribbean collecting venture for woody species on behalf of the Yale University School of Forestry.

Details of the botanical explorations prosecuted by the present writer in 1937-1940 are discussed below. Suffice it to say that from several correspondents and friends have come a few small collections of Dominica plants. These include those from *R. C. Fennah* (formerly of the Imperial Forest Service at Trinidad) and Dominica residents like *John Knowlton* of Sylvania, *Leo Narodny* of L'Imprevue, and especially *Douglas Taylor* of Magua, who has collaborated with me in a study of the ethnobotany of the Island Caribs (31) and is the source of certain of the ethnobotanical information appearing in this flora. The most recent botanical visitors to Dominica have been *John Beard* (1946) and *Richard A. Howard* (1950). Beard, formerly stationed with the Imperial Forest Service at Trinidad has studied forest ecology and composition with emphasis on woody species. His excellent ecological monograph on the vegetation of the Caribbean islands was published recently (5) and one discussing botanical collections is promised. My friend, Richard Howard of Harvard University with wide interest in the Caribbean area, limited his collections in Dominica to special groups.

Despite the number of botanical visitors to Dominica and in spite of this initiation of a formal flora for the island much critical collecting remains to be done. One might guess that at least three-fourths of the vascular plants have been collected in Dominica. This is based on the fact that in a family like the orchids, which because of its popularity is usually one of the first to receive attention, at least forty species known on both Martinique and Guadeloupe (adjoining on either side of Domin-

ica) are yet to be collected on Dominica where they most certainly must occur.

A summary list of the principal Dominica plant collectors together with the present location of their specimens (if known) follows. The symbols used are those of Lanjouw's *Index Herbariorum*—Arnold Arboretum (A); Berlin-Dahlem (B); Bailey Hortorium (BH); British Museum (BM); Clark University, Worcester (CLARK); Gray Herbarium (GH); Goettingen (GOET); Kew (K); New York Botanical Garden (NY); Academy of Natural Sciences, Philadelphia (PH); Botanical Institute of Charles University, Prague (PRC); Imperial College of Tropical Agriculture, Trinidad (TRIN); United States National Museum (US).

LIST OF KNOWN PLANT COLLECTORS FOR DOMINICA, B. W. I.

Anderson, Alex.....	(Plants of his are cited in Swartz (51))
Bailey, L. H.....	(BH, US)
Barber, Charles Alfred.....	
Beard, John A.....	(A, TRIN)
Cooper, G. Proctor.....	(GH, NY, US)
Domin, K.....	(K, PRC)
Duss, Antoine.....	(B, GH)
Eggers, H. F. A.....	(B, GH, NY)
Elliott, William R.....	(K)
Fairchild, David.....	(US)
Fennah, R. C.....	(TRIN)
Fishlock, W. C.....	(GH, NY, US)
Finlay, Kirkman.....	
Gregg, J.....	(BM)
Harcourt, F. G.....	(K)
Haweis, Stephen.....	(US)
Hitchcock, A. S.....	(US)
Hodge, W. H. and Barbara T.....	(BH, BM, CLARK, GH (Original set), NY, US)
Hoskin.....	
Howard, R. A.....	(GH)
Imray, John.....	(B, GH, GOET)
Johow, Friedrich.....	(B)
Jones, Joseph.....	(K)
Knowlton, John.....	(GH)
Lloyd, Francis E.....	(GH, NY, US)
Miller, Gerrit S.....	(US)
Morris, Daniel.....	(K)
Nicholls, H. A. A.....	(K)
Porthieu, de.....	(Plants of his are cited in Swartz (51))
Pursh, Friedrich.....	(?)
Ramage, G. A.....	(GH, K)
Schimper, A. F. S.....	(B)
Taylor, Douglas.....	(BH, GH)
Wakefield, Miss.....	(K)
Walsh, J. J.....	(K)

During a part of August and September in 1937, from July to early September in 1938, and from February to June in 1940, the writer with the help of his wife prosecuted botanical fieldwork in Dominica. This work was aided to a considerable extent through funds or fellowships received from Harvard University. The specimens obtained on these three trips total more than 4,000 collection-numbers and represent, it is believed, a good cross-section of the vascular flora of this island. Certain aspects of this field work, whose study was interrupted by the recent war, have already been reported upon.

For permanence the writer's field-numbers and notes are listed below. Collections in 1937, when only two weeks were spent on the island, were few, totalling approximately 300 numbers. Most of these were collected during August around Lisdara (near Belle Vue), at the height of land on the Grand Bay road. The remainder came from the lower Layou Valley, the Roseau Botanic Gardens, near Wotten Waven, and on Morne Daniel (Chattanooga).

The 1938 collections have been combined, as far as the numbering is concerned, with those of 1937 so that all the writer's numbers between 1 and 1,011 represent plants obtained on these first two field trips. Collections in 1938 were made in the vicinity of Roseau, at Marigot, between Marigot and Salybia, between Marigot and Melville Hall, in and around Portsmouth, on the Cabrits, on Morne Anglais, on Morne Colla Anglais, on Morne Trois Pitons, and throughout the region surrounding Sylvania. These 1938 specimens were collected between July 16th and September 1st.

The majority of the 1940 collections all bear the collectors' names, W. H. & Barbara T. Hodge; they include the numbers between 1012 and 4007, and were gathered between February 9th and May 25th. The numbers represent a series of different collection-localities which are as follows: 1012-1027, 1335-1373, 3997, near Waterfalls of the Massacre River located between Sylvania and Mt. Joy; 1028-1053, 1080, 1081, 1170-1190, Morne Colla Anglais, just southwest of Sylvania; 1054-1079, Morne Negre Maron; 1082-1099, 1100-1169, 1243-1250, 1302, 1310-1334, 3964-3991, 1430-1441, 2500-2503, 2505-2511, 3819-3853, 3882, 3960, various places in the vicinity of Sylvania; 1191-1242, 3961, trail between Imperial Road and Castle Bruce, vicinity of the north base of Morne Trois Pitons; 1251-1301, old road between Mt. Joy and L'Imprevue; 1303-1309, near village of Mahaut; 1374-1438, 3963, Morne Trois Pitons; 1442-1601, 1649-1654, 3875-3881, 4005, South Chiltern; 1603-1648, between South Chiltern, Soufrière Village and Scot's Head; 1655-1743, 3999, 4006, 4007, Morne Plat Pays; 1745-1881, 1955-1989, 2033-2121, 3993, 3998, various places about Laudat; 1990-2032, 3994, near base of Roseau Valley Waterfalls below Laudat; 2252-2312, 2220, 2240-2251, 2313-2315, 4002, Morne Anglais; 2122-2219, 2316, 3898-3901, 3959, Ridgefield estate, near Eggleston; 2221-2239, border of Ridgefield and Badineau estates; 2317-2499, 4001, Lisdara; 2404, vicinity Roseau; 2512, 2513, 3883-3888, 3902-3956, Botanic Garden at Roseau; 2514-2555, trail from Dublanc to Milton; 2556-2632, 2703-2728, 2868-2931, 2756-2765, 2772, 3992, 3995, vicinity of Milton and Syndicate; 2633-2702, 2727-2755, 2765-2771, coastal vegetation, vicinity of Pointe Ronde; 3962, 2773-2836, Morne Diablotin (all

altitudes); 2837-2867, Fon Pays; 2932, Portsmouth; 2933-2963, 3006-3080, 3133, 3182-3183, Hatton Garden; 2964-3005, 3101-3132, 3416-3495, 3958, Valley of Pegoua River, vicinity of Deux Branches; 3081-3100, Hatton Garden to Salybia; 3134-3181, 3733-3738, along road north of Calibishie; 3184-3224, 3358-3363, Salybia to Bataka; 3225-3306, Salybia to Concorde Valley; 3307-3357, Salybia to Gaulettre River; 3365-3415, Salybia to Atkinson; 3496-3504, 3739-3742, Pointe Baptiste and Woodford Hill; 3505-3699, 4000, La Chaudière, the camp of Mrs. Elma Napier on the Hampstead River, 2 miles west of its mouth; 3700-3732, East Cabrit, northwest of Portsmouth; 3743-3758, Indian River estuary; 3759-3818, Batalie to St. Joseph's via Grand Savanna; 3854-3874, coastal road between Loubière and Solomon's Slide; 3889-3897, base of Morne Daniel cliffs.

The original set of specimens collected by the writer in Dominica is deposited in the Gray Herbarium of Harvard University under whose auspices the study of this flora was initiated. Partial sets may also be found in the herbaria of the New York Botanical Garden, the British Museum (Natural History), the Smithsonian Institution (chiefly pteridophytes), Clark University (Worcester, Mass.), the University of Massachusetts, and the Bailey Hortorium (palms).

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Not included in this bibliography are the numerous botanical references used in the preparation of the systematic catalogue of vascular plants. The more important of these references appear as footnotes in their proper places throughout the catalogue.

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INTRODUCTION TO THE CATALOGUE OF VASCULAR PLANTS

The catalogue which follows initiates an enumeration of all native vascular plants known to occur in Dominica together with colloquial names, essential synonymy, occurrence, and general descriptive and economic notes. Thus an attempt has been made to make the catalogue more than a mere list of the plants of Dominica. Detailed botanical

descriptions however have been omitted with the idea that such are unnecessary in the treatment of the flora of a single island the size of Dominica. Rather such descriptions should be relegated to a comprehensive flora covering all islands of the Lesser Antilles lying between Anguilla and Grenada, islands comprising a natural floristic region. This area is much in need of a modern work of this type which would fill one of the big gaps in our knowledge of West Indian plants. A number of the Caribbee Islands now have brief local floras or lists of one kind or another. Dominica, one of the most important floristically, has been one of the last to be heard from. It is hoped that the appearance of the present work will give further impetus to the preparation of the all-inclusive Lesser Antillean flora mentioned above.

To offset somewhat the lack of descriptions all keys that have been included (to families, genera, and species) are sufficiently detailed, it is believed, to enable one to identify any vascular plant listed from Dominica. Whenever possible both vegetative and reproductive characters have been included in their construction. It should be stated here that in general the keys contain only those characters of a given species, genus or family as it occurs in Dominica. Persons using these keys should also remember that there are probably a considerable number of unrecorded species on the island which remain uncollected. In some instances certain of these species that are known from Guadeloupe and Martinique have been included in the keys (within parentheses). Obviously it would be impossible to include all. It is to be recommended therefore that tentative identifications should be checked whenever possible with a description in one of the standard West Indian floras, or better, with authentic herbarium specimens.

Synonymy included in the catalogue, although not complete, is intended to give ready reference to at least one good description of the species, and to include not only all important synonyms used in the principal West Indian floras but also the basonym as well.

Colloquial names are often valuable in the determination of the scientific name and for this reason they have been included whenever known. Three types of colloquial names are met with in Dominica. These represent the three idioms which have had a period of use on the island. There still persist a handful of the Island Caribs, an Indian race which peopled the Lesser Antilles at the time of the Discovery. Their dialect (which was really a combination of two, namely Carib and Arawak) is no longer spoken but many native plants still bear Carib names (viz., *larouman*, *mibi*, *casibu*). Many Carib names have French forms given during the early period when Dominica was a French possession. Today the colored population of Dominica speaks a corrupted French or patois (used also by the natives of Guadeloupe, Martinique, and St. Lucia) with the result that most of the local plant names are in this idiom. Certain peculiarities of pronunciation (patois is only a spoken language) make it difficult to write patois names and so many of the common plant names included in this work are only phonetic approximations of the spoken words. For instance the letter *r* is seldom pronounced as such but rather as a *w* (viz. the name of the tall reed-grass, *roseau*, is always given as *woseau*). Most trees are *bois* this or *bois* that (viz. *bois canon*), while the names of most herbaceous plants are preceded by the corrupted form of *l'herbe* which sounds like *zeb*

(viz. *l'herbe couteau* is pronounced *zeb couteau*). Another corruption much used in colloquial names is in the addition of the French adjective *petite*. For example, *Myrcia splendens* should be called properly *bois petite feuille*, but in patois this becomes *bois 'tit feuille*, or just *'tit feuille*. The third type of local name is the English one.

The greater proportion of collections cited in the descriptive catalogue are those made by the writer (and his wife) on three field-trips to Dominica undertaken during the period, 1937 to 1940. In order that future contributors to the flora of this region may be able to critically check the species here recorded, all collection-numbers made by me have been cited in parentheses following the listing of localities. Specimen material of other collectors has not been generally available and so has not been enumerated except when it represents the sole basis of a Dominica record. In cases of this sort the name of the collector, and collection-number and locality (if known), as well as the source of the citation are stated [viz. (*Jones 37*) ex Hitchcock, under *Oplismenus hirtellus*]. For the sake of a better knowledge of local distribution in Dominica, the writer has frequently cited localities at which a given species was seen but not collected. (WHH!)

Besides citations of localities (Fig. 10) and of collection-numbers there also have been included remarks on the relative abundance of each species, type of habitat, and altitudinal distribution. Altitudes are generalized and have been split into three subheadings: lower elevations (sea level to 1,500 feet), middle elevations (1,500–2,500 feet), highest elevations (above 2,500 feet). These subheadings roughly parallel (at least on the leeward coast) the distribution of the principal climax formations—the xerophytic seasonal formations, the optimal rain forest, and the montane formations (Fig. 11). Finally there are included pertinent ecological and economic notes of general interest.

The writer has made free use of much recent botanical literature. Especially valuable have been the modern floras of the West Indian and Caribbean region as well as monographs and synoptic treatments of certain plant groups. Those works which have proven especially useful have been cited in the proper place as footnotes.

The format initiated in this the first of two parts on the flora of Dominica will be continued in another part, dealing with the dicotyledons. The sequence of families is that of Engler and Prantl.

CATALOGUE OF THE VASCULAR PLANTS OF DOMINICA

Key to Phyla

Plants without true flowers, producing spores, not seeds

..... I. PTERIDOPHYTA (page 54)

Plants with true flowers, producing seeds..... II. SPERMATOPHYTA (page 108)

I. PTERIDOPHYTA. Ferns and Fern Allies*

Key to Families

a. Leaves generally 2 cm. or more long, with at least a part expanded; sporangia borne on the back of the leaves, or in terminal spikes or panicles, or in special conceptacles..... b

*References—Domin, Karel: The Pteridophyta of the island of Dominica. Praha, 1929. Maxon, William R.: Pteridophyta in Britton and Wilson, Botany of Porto Rico and the Virgin Islands, Scient. Surv. of Porto Rico 6 (1926): 373–521.

- b. Sporangia large, coalescent or separate, opening by regular pores or slits.....c
- c. Leaves simple, entire, solitary (rarely 2), small with reticulate venation; sporangia united in two rows, opening by transverse slits, and borne on a simple slender erect long-stalked spike.....1. OPHIOGLOSSACEAE (page 55)
- c. Leaves compound (simply pinnate), never solitary, large with free veins, jointed to the rhizome, fertile leaves much smaller than the sterile; sporangia dorsal, coalescent in double rows, forming linear immersed synangia opening by vertical pores.....2. MARATTIACEAE (page 55)
- b. Sporangia small, borne in clusters or masses on ordinary blades or their modified parts, opening by means of an elastic ring (annulus).....d
- d. Sporangia sessile or short-stalked (includes tree-ferns, filmy ferns, and ferns with dichotomous branching leaves).....e
- e. Sporangia not borne in definite sori but in a close single row on either side of the ultimate divisions of a partially dimorphous (only the basal pair of pinnae fertile) leaf; sterile fronds 15-70 cm. long, 2-3-pinnate with lustrous coriaceous blades.....3. SCHIZAEACEAE (page 56)
- e. Sporangia associated in definite sori.....f
- f. Large terrestrial ferns; leaf tissue thick (several to many cells thick); sori not marginal.....g
- g. Sporangia subglobose or obconic, few, opening vertically; sori flattish with low receptacles; non-arborescent weedy ferns with long creeping rhizomes; primary leaf axis of indeterminate growth with dichotomous lateral branches, the ultimate ones paired.....4. GLEICHENIACEAE (page 57)
- g. Sporangia ovoid, numerous, opening horizontally; sori nearly globose, with strongly elevated receptacles; arborescent ferns with a crown of very large fronds.....6. CYATHEACEAE (page 64)
- f. Small, often epiphytic ferns; leaf tissue very thin, generally 1 cell thick (filmy ferns); sori always marginal, terminal upon the free ends of the veins and within tubular or bivalvate indusia.....5. HYMENOPHYLLACEAE (page 57)
- d. Sporangia long-stalked.....7. POLYPODIACEAE (page 66)
- a. Leaves small, less than 2 cm. long, scale-like, 4-to many ranked.....h
- h. Spores uniform; plants often epiphytic.....i
- i. Stems leafy; the leaves in 4 or more rows; sporangia 2-valvate.....8. LYCOPODIACEAE (page 104)
- i. Stems essentially naked; the leaves few, scale-like, in 2 or 3 rows; sporangia 3-valvate.....9. PSILOTACEAE (page 107)
- h. Spores of two kinds and sizes; plants usually terrestrial.....10. SELAGINELLACEAE (page 107)

1. OPHIOGLOSSACEAE—Ophioglossum Family

1. OPHIOGLOSSUM (Tourn.) L.

1. OPHIOGLOSSUM RETICULATUM L.

Sp. Pl. 1063 (1753); Griseb. Fl. Br. W.I.I. 649 (1864); Br. & Wils. Bot. P.R. vi. 374 (1926).

A widely distributed pantropical fern; in Dominica infrequent in open situations at lower to middle elevations—Ridgefield (2192)

2. MARATTIACEAE—Marattia Family*

*The genus *Marattia* is reported from Dominica apparently in error. In the North American Flora the type locality of *Marattia kaulfussii* J. Smith is stated to be "Dominica" but this undoubtedly is an error for Santo Domingo (now Hispaniola) in the Greater Antilles. Grisebach also suggests that *Marattia laevis* J. E. Smith has also had a similarly confused origin.

1. DANAEA J. E. Smith

Key to Species

Pinnae of the sterile leaves more than 2.5 cm. wide.

Stipes without nodes; pinnae of the sterile blades 20–40 cm. long; veins simple but paired.....1. *D. nodosa*

Stipes with 1 to 4 nodes; pinnae of the sterile blades 5–18 cm. long; veins mostly forked.....2. *D. elliptica*

Pinnae of the sterile leaves less than 2.5 cm. wide.....3. *D. fendleri*

1. DANAEA NODOSA (L.) J. E. Smith

In Mém. Acad. Turin v. 420 (1793); Griseb. Fl. Br. W.I.I. 649 (1864); Br. & Wils. Bot. P.R. vi. 376 (1926). *Acrostichum nodosum* L. Sp. Pl. 1070 (1753).

A large terrestrial species with wide distribution in tropical America, inhabiting moist ravines or rain forests at middle and higher elevations. An Eggers collection without number or locality is the sole record for Dominica (see Domin).

2. DANAEA ELLIPTICA J. E. Smith

In Rees Cycl. 11, *Danaea* no. 2 (1808); Griseb. Fl. Br. W.I.I. 649 (1864); Br. & Wils. Bot. P.R. vi. 377 (1926).

Circum-Caribbean in distribution; in Dominica found in wet forests at middle and higher elevations—La Chaudière (3587), Morne Anglais (1), Pegoua River Valley (3127), Sylvania (3969).

3. DANAEA FENDLERI Underwood

In Bull. Torrey Bot. Cl. xxix. 673 (1902).

A Lesser Antillean species; in Dominica occasional as a terrestrial fern in mossy forests at higher elevations—Morne Anglais (1A), Morne Plat Pays (1682).

Danaea stenophylla Kunze occurs on Guadeloupe and Martinique and hence is to be expected in Dominica. In the above key to the Dominica species it would key out to *D. fendleri* from which it may be separated by its forking veinlets, occurring 12–15 per cm.; the veinlets are simple in *D. fendleri*.

3. SCHIZAEACEAE—Schizaea Family

1. ANEMIA Sw.

1. ANEMIA ADIANTIFOLIA (L.) Sw.

Syn. Fil. 157 (1806); Griseb. Fl. Br. W.I.I. 650 (1864); Br. & Wils. Bot. P.R. vi. 382 (1926). *Osmunda adiantifolia* L. Sp. Pl. 1065 (1753).

Common throughout tropical America on dry open or brushy slopes at lower to middle elevations—Hatton Garden (3042), Marigot (3), Morne Bruce (2), Ridgefield (2128).

Anemia hirta (L.) Sw., a species of moist shady situations, is known from both Guadeloupe and Martinique and undoubtedly will be found in Dominica. It differs from the above species in having its non-indusiate fertile pinnae arising at or near the base of the 1-pinnate sterile blade, as opposed to the indusiate but distant fertile pinnae and 2–3-pinnate sterile blades of *A. adiantifolia*.

4. GLEICHENIACEAE—Gleichenia Family

1. DICRANOPTERIS Bernh.

Key to Species

- Pinnae glaucous beneath; veins 3-5 forked.....1. *D. pectinata*
 Pinnae not glaucous beneath, granular or tomentose; veins 1-forked.
 Pinnae narrow (2 cm. or less broad), undersurface granular—beset with
 short erect clavate bodies.....(*D. farinosa*)*
 Pinnae wider (3-7 cm. broad), densely rusty-tomentose beneath...2. *D. bifida*

1. DICRANOPTERIS PECTINATA (Willd.) Underwood

In Bull. Torrey Bot. Club xxxiv. 260 (1907); Br. & Wils. Bot. P.R. vi. 383 (1926).
Mertensia pectinata Willd. Sv. Vet. Akad. Handl. II. xxv. 168 (1804); Griseb. Fl.
 Br. W.I.I. 652 (1864).

Widespread in tropical America; in Dominica on dryish slopes, banks, and open ridges chiefly at middle and higher elevations—Morne Negre Maron (1056); reported by Domin from Laudat, Freshwater Lake, Boeri Lake, Breakfast River, and crater of Boiling Lake. The species is less common than *D. bifida* but is found on similar sites.

2. DICRANOPTERIS BIFIDA (Willd.) Maxon (Fig. 37)

N. Am. Fl. xvi. 60 (1909); Br. & Wils. Bot. P.R. vi. 384 (1926). *Mertensia bifida* Willd. Sv. Vet. Akad. Handl. II. xxv. 168 (1804).

Common and widespread in tropical America; in Dominica a common weedy pioneer forming extensive sprawling colonies on disturbed land such as slides, roadcuts, and the like—Castle Bruce Trail (1217), Lisdara (4), Morne Anglais (2267), Morne Plat Pays (1708), Mount Joy (1271), South Chiltern (1790), Sylvania (5). This species, with the tree-fern, *Cyathea arborea*, is often found on abandoned cultivations. The soil on which these species grow is invariably sterile hence the ferns are considered locally as good soil indicators.

Three other species of the genus occur in the neighboring French islands and so may be expected in Dominica. They include *Dicranopteris bancroftii* (Hook.) Underw. (with bipinnate primary branches and a non-forked rachis), *D. flexuosa* (Schrad.) Underw. (similar to *D. pectinata* but differing in the possession of a pair of accessory pinnae at all but the ultimate nodes), and *D. furcata* (L.) Underw. (resembling *D. bifida* but with segments not rusty-tomentose below).

5. HYMENOPHYLLACEAE—Filmy-Fern Family

Key to Genera

- Indusium narrowly tubular-cuneate to salverform, truncate and entire at the mouth, or the limb (if developed) shallowly to deeply bilobed; receptacle filiform, usually long-exserted.....1. *Trichomanes*
 Indusium purselike, orbicular to triangular-ovate, bifid or very deeply bilobed, the lobes large, free above the truncate or broadly cuneate base, a tube rarely developed; receptacle filiform or clavate, usually included, often deeply so.....2. *Hymenophyllum*

*A species limited to the volcanic summits of St. Kitts, Guadeloupe, and Martinique, but reported in error from other areas. Domin states that the species is unknown from Dominica, although Grisebach, who includes several species under the name *Mertensia farinosa*, cites an Imray collection. The species is to be expected in Dominica.

1. TRICHOMANES L.

Key to Species

- a. Ferns with wide-creeping, usually filiform or capillary rhizomes; generally colonial; fronds mostly insignificant (usually under 10 cm. long).
- b. Indusia ending abruptly in 2 large, roundish dark-marginate lips; margins of blades furnished with stiff, dark, recurved-stellate hairs.
- c. Fronds 1–2 cm. long, the blades entire to coarsely lobed or pinnatifid
 - d. Costa either wholly wanting or not extending beyond the middle, the venation flabellate.....1. *T. punctatum*
 - d. Costa percurrent, the venation distinctly pinnate....2. *T. pusillum*
- c. Fronds 2–6 cm. long; the blades subpinnatisect, the pinnae lobed or pinnatifid.....3. *T. kraussii*
- b. Indusia expanded at mouth or not, the limb (if developed) entire or shallowly bilobed, not dark-marginate; marginal hairs, if present, not rigidly recurved-stellate.
- e. Costa wanting, the venation flabellate; marginal interspaces bearing each a pair of opposed suborbicular sessile membranaceous squamules.....4. *T. membranaceum*
- e. Costa present, forming usually a well-defined midrib, the venation 1–4 pinnate; marginal squamules wanting.
- f. Veins transversely joined, at least near the margin...5. *T. hookeri*
- f. Veins wholly free.
 - g. Blades sinuate-lobate to deeply pinnatifid.
 - h. Fronds 5–15 mm. long, as broad as long, sessile.6. *T. hymenoides*
 - h. Fronds 20–60 mm. long, much longer than broad, with a more or less alate stipe.....7. *T. polypodioides*
 - g. Blades deeply 3-pinnatifid.....8. *T. hymenophylloides*
- a. Ferns with erect, suberect or short-creeping, non-filiform rhizomes; not colonial; fronds mostly 10 cm. or more long.
- i. Veins transversely joined at least near the margin.....9. *T. pinnatum*
- i. Veins wholly free.
 - j. Blades sinuate-lobate to pinnatisect, the primary segments (if developed) subentire to pinnately lobed or subpinnatisect.
 - k. Fronds dimorphic, the indusia borne along the primary rachis of a specialized reduced blade.....10. *T. osmundoides*
 - k. Fronds not dimorphic, the indusia borne along the margins of normal leafy tissue.
 - 1. Fronds rigidly erect, the blades rounded-obtuse at apex.....11. *T. holopterum*
 - 1. Fronds ascending, the blades long-acuminate or attenuate upward.
 - m. Stipes conspicuously alate.....12. *T. alatum*
 - m. Stipes not conspicuously alate
 - n. Stipes glabrous.....13. *T. trigonum*
 - n. Stipes non-glabrous, laxly covered with hairs.....14. *T. crispum*
 - j. Blades 3–4 pinnate.
 - o. Rhachises non-alate, subterete, scarcely marginate...15. *T. rigidum*
 - o. Rhachises alate.....16. *T. elegans*

1. TRICHOMANES PUNCTATUM Poir.

In Lam. Encycl. viii. 64 (1808); Griseb. Fl. Br. W.I.I. 657 (1864); Br. & Wils. Bot. P.R. vi. 496 (1926). *Trichomanes sphenoides* Kunze in Linnaea ix. 102 (1834).

A variable creeping colonial species found throughout much of tropical America; in Dominica occasional at lower to middle elevations in dense shade on rocks or tree trunks—Carib Reserve (3355), Massacre River Falls (1017), Pegoua River Valley (3003), South Chiltern (1564), Syndicate (2720). The writer has found it impossible to separate *T. sphenoides* Kunze from the present species.

2. *TRICHOMANES PUSILLUM* Sw.

Prodr. 136 (1788); Griseb. Fl. Br. W.I.I. 656 (1864); Br. & Wils. Bot. P.R. vi. 497 (1926).

A West Indian species also known from Venezuela; occasional in Dominica in dense shade on tree trunks of rainforests at middle elevations—Morne Diablotin (2796), Pegoua River Valley (2998); also recorded by Domin from Homewood.

3. *TRICHOMANES KRAUSII* Hook. & Grev. (Fig. 38)

Icon. Fil. ii. pl. 149 (1831); Griseb. Fl. Br. W.I. 656 (1864); Br. & Wils. Bot. P.R. vi. 497 (1926).

A species found throughout the West Indies and sparingly on the continent from Guatemala to Bolivia and Brazil. Originally described from Dominica the species is found at lower to middle elevations usually being gregarious on the trunks of large forest trees—La Chaudière (3683), Lisdara (142, 143, 2333, 2428), Roseau Valley Falls (1997, 2032), South Chiltern (1503, 1597), Syndicate (2721).

4. *TRICHOMANES MEMBRANACEUM* L.

Sp. Pl. 1097 (1753); Griseb. Fl. Br. W.I.I. 658 (1864); Br. & Wils. Bot. P.R. 498 (1926).

Found throughout the West Indies and on the continent from Nicaragua to Bolivia and Venezuela; in Dominica locally common at middle elevations where it is found in humid shaded ravines growing gregariously on rocks, cliffs, or on the trunks of forest trees—Carib Reserve (3243), Lisdara (2405), Massacre River Falls (1016, 1019), Pegoua River Valley (3123), Ridgefield (2214), Roseau Valley Falls (3994), South Chiltern (1563), Sylvania (1097), Syndicate (2892); also recorded from Laudat and the Lakes.

5. *TRICHOMANES HOOKERI* Presl.

In Abh. Böhm. Ges. Wiss. V. iii. 108 (1843); Br. & Wils. Bot. P.R. vi. 498 (1926). *Trichomanes muscoides* Hook & Grev., Griseb. Fl. Br. W.I.I. 657 (1864).

A colonial, widely-creeping species of the West Indies and northern South America; in Dominica occasional at middle elevations usually as an epiphyte near the bases of the trunks of large forest trees—La Chaudière (3584), Syndicate (2891); also reported from Homewood (Domin).

6. *TRICHOMANES HYMENOIDES* Hedw.

Fil. Gen. & Sp. pl. 4, fig. 3 (1799).

Widespread in tropical America but in the West Indies apparently known only from Cuba, Hispaniola, Dominica, and Barbados; in Dominica known only from woodlands about Lisdara (140, 2372) where it occurs as an epiphyte on shaded tree trunks.

7. *TRICHOMANES POLYPODIODES* L.

Sp. Pl. 1098 (1753); Br. & Wils. Bot. P.R. vi. 499 (1926). *Trichomanes sinuosum* Rich., Griseb. Fl. Br. W.I.I. 655 (1864).

Widespread throughout tropical America; in Dominica occasional in rain-forests at middle elevations where it is found on tree trunks or

more commonly the trunks of the treefern, *Hemitelia muricata*—La Chaudière (3585), Lisdara (141, 2383), Sylvania (1096, 3975), Syndicate (2722).

8. *TRICHOMANES HYMENOPHYLLOIDES* v.d. Bosch

In Nederl. Kruidk. Arch. v. 209 (1863); Br. & Wils. Bot. P.R. vi. 503 (1926). *Trichomanes pyxidiferum* Hook. & Grev., not L., Griseb. Fl. Br. W.I.I. 655 (1864).

Widespread in tropical America; in Dominica common on tree-trunks and wet rocks in humid forests at middle to higher elevations—La Chaudière (3573), Lisdara (2409), Massacre River Falls (1018), Morne Diablotin (2824), Morne Trois Pitons (145, 1400), Pegoua River Valley (3105, 3421, 3422), Syndicate (2890); also recorded from Hampstead (Lloyd 649) and Laudat (Lloyd 347).

Trichomanes radicans Sw. occurs in the French Antilles and is to be expected in Dominica. It would key out to *T. hymenophylloides* in the above key but differs from the present species in its thicker (1–2mm.) woody rhizome and longer (15–40 cm.) fronds.

9. *TRICHOMANES PINNATUM* Hedw.

Fil. Gen. Sp. pl. 4, fig. 1 (1799); Br. & Wils. Bot. P.R. vi. 499 (1926).

A variable terrestrial species with wide distribution throughout tropical America; in Dominica occasional at lower to middle elevations usually on bankings of bare clay in shade or sun—Dublanc (2546), La Chaudière (3517), Marigot (148); also reported by Domin from Laudat.

10. *TRICHOMANES OSMUNDOIDES* DC. ex Poir.

Encycl. viii. 65 (1808). *Trichomanes spicatum* Hedw., Griseb. Fl. Br. W.I.I. 652 (1864).

Essentially Lesser Antillean in distribution; in Dominica not uncommon at middle and higher elevations occurring as a terrestrial species in humus or between the roots of trees in the shade of rain-forests or mossy forests—La Chaudière (3583), Milton (2869), Morne Trois Pitons (149), Pegoua River Valley (3428), Sylvania (3837); also reported by Domin from Homewood, Laudat, upper Layou, and the Macoucherie Ridge.

11. *TRICHOMANES HOLOPTERUM* Kunze

In Farnkr. i. 185 (1845); Br. & Wils. Bot. P.R. vi. 500 (1926).

With scattered distribution in the West Indies from Cuba south to Grenada; occasional in Dominica as an epiphyte or a terrestrial in rich humus at middle to higher elevations—Morne Trois Pitons (146), Sylvania (3836, 3983), Syndicate (2618); also reported by Domin from the Macoucherie Ridge.

12. *TRICHOMANES ALATUM* Sw.

Journ. Bot. Schrad. 1800 17 (1801); Griseb. Fl. Br. W.I.I. 654 (1864); Br. & Wils. Bot. P.R. vi. 501 (1926).

Found throughout the West Indies from Cuba to Trinidad, also in Venezuela; in Dominica common at middle to higher elevations, occurring in humus, on tree-trunks, or wet rocks—Freshwater Lake

(1858) La Chaudière (3567), Laudat (1768, 1818), Milton (2872), Morne Diablotin (2797), Morne Micotrin (2076), Morne Nicholls (1908), Morne Plat Pays (1677), Morne Trois Pitons (1416), Pegoua River Valley (2999, 3486), Sylvania (147).



FIG. 37. *Dicranopteris bifida*, near Lisdara. (Upper left).

FIG. 38. *Trichomanes kraussii*, on a tree trunk at South Chiltern. (Upper right).

FIG. 39. *Hymenophyllum polyanthos*, at Sylvania. (Lower left).

FIG. 40. *Acrostichum daneaeifolium*, among coconuts at Blenheim. (Lower right).

13. *TRICHOMANES TRIGONUM* Desv.

In Berl. Mag. v. 328 (1811). *Trichomanes kaulfussii* Hook. & Grev., Griseb. Fl. Br. W.I.I. 654 (1864).

Apparently essentially Lesser Antillean but reported also from Guiana to Brazil; in Dominica at middle and higher elevations being fairly common as a terrestrial species in the mossy forests—Morne Anglais (152, 2263), Morne Negre Maron (1061), Morne Nicholls (1912), Morne Plat Pays (1678), Morne Trois Pitons (151, 1410); also reported from Homewood, Laudat and the nearby Lakes, and Sylvania (*Cooper* 101).

14. *TRICHOMANES CRISPUM* L.

Sp. Pl. 1097 (1753); Br. & Wils. Bot. P.R. vi. 500 (1926).

Found throughout the West Indies and tropical America; in Dominica rather common at middle to higher elevations being found usually on the ground in humus or more commonly on rotting logs—Castle Bruce Trail (1228), La Chaudière (3518, 3674), Laudat (3993), Lisdara (144), Morne Anglais (2280), Morne Plat Pays (1707), Sylvania (3974), Syndicate (2717, 2906, 3995).

15. *TRICHOMANES RIGIDUM* Sw.

Prodr. 137 (1788); Griseb. Fl. Br. W.I.I. 656 (1864); Br. & Wils. Bot. P.R. vi. 501 (1926).

A widespread pantropical species; in Dominica common at higher elevations especially in the mossy forests on shaded sites on bare ground at the base of tree trunks, on rotten logs, or on mossy boulders—Castle Bruce Trail (1230, 1236). Morne Anglais (153), Morne Nicholls (1911), Morne Plat Pays (1681), Morne Trois Pitons (154, 1402, 1405, 1413).

16. *TRICHOMANES ELEGANS* L. C. Rich.

In Acta Soc. Hist. Nat. Paris i. 114 (1792). *Trichomanes prieurei*, of authors, Griseb. Fl. Br. W.I.I. 656 (1864), as to the Dominica citation.

A terrestrial species of Jamaica, Hispaniola, the Lesser Antilles, and northern South America; in Dominica locally common in the humus of forest floors at middle to higher elevations—Laudat (1770, 1978), Milton (2871), Morne Trois Pitons (150), Sylvania (1901), Syndicate (2893); also reported by Domin from Breakfast River, Homewood, and the Macoucherie Ridge. This is the largest and one of the handsomest of the local species of the genus.

2. *HYMENOPHYLLUM* J. E. Smith*Key to Species**

- a. Blades glabrous throughout.
- b. Stipes terete, neither marginate nor alate. (*H. crispum* H.B.K.)
- b. Stipes marginate upward.
- c. Blades coarsely 2-pinnatifid, segments 1–2 mm. broad.
- d. Segments 3–6 per pinna, entire. (*H. macrothecum* Fée)

*Species in parentheses occur on one or both of the neighboring French Antilles and so may be expected in Dominica.

- d. Segments generally more than 6 per pinna, finely toothed.
- e. Sori usually 1-2 per pinna, indusial valves toothed
.....1. *H. fucoides*
- e. Sori often 4-5 per pinna, indusial valves deeply lacinate
.....2. *H. ectocarpum*
- c. Blades finely and deeply 3-4 pinnatifid, segments 1 mm. broad or less
.....3. *H. polyanthos*
- a. Blades hairy.
- f. Hairs lacking on the leaf surfaces, borne only on the veins and margins.
- g. Stipes delicate, not over 0.3 mm. in diameter, usually less, short, not over 5 cm. long, usually less.
- h. Rhachis not alate to base.
- i. Pinnae (at least the lower) short-petiolulate
.....(*H. lineare* (Sw.) Sw.)
- i. Pinnae sessile or adnate.....(*H. elegans* Spreng.)
- h. Rhachis alate to base.
- j. Stipe hairs mostly stellate.....4. *H. hirsutum*
- j. Stipe hairs mostly simple.....(*H. crispum* H.B.K.)
- g. Stipes stouter, 0.5-0.7 mm. in diameter, the larger almost always 5 cm. long or more.....(*H. valvatum* Hook. & Grev.)
- f. Hairs present on the leaf surfaces, as well as on the veins and margins.
- k. Veins not winged on either side of the frond.
- l. Stipes filiform, 0.2-0.25 mm. in diameter.
- m. Leaf segments 2.5-3 mm. broad, hairs 1-3 mm. long
.....5. *H. latifrons*
- m. Leaf segments 1.5-1.7 mm. broad, hairs averaging 0.5 mm. long.....(*H. lanatum* Fée)
- l. Stipes stouter, 0.4-0.6 mm. in diameter
.....(*H. sieberi* (Presl) v. d. Bosch)
- k. Veins on both sides of the frond bearing 2 rather narrow, green wings.....(*H. sericeum* (Sw.) Sw.)

1. HYMENOPHYLLUM FUCOIDES Sw.

In Journ. Bot. Schrad. **1800**. 99 (1801); Griseb. Fl. Br. W.I.I. 659 (1864).

A species widely distributed in the tropics; in Dominica apparently of rare occurrence, the sole record based on a Lloyd collection (350) from Laudat.

2. HYMENOPHYLLUM ECTOCARPON Fée

Hist. Foug. et Lyc. Ant. 115. t. 31, f. 1 (1866).

A rare Lesser Antillean species known only from Guadeloupe and Dominica; in Dominica occurring as epiphytes on tree trunks in deep shade of middle elevation rain forests—Sylvania (1094), Syndicate (2899). This species is very close to the preceding and might better be treated as a subspecific category of it.

3. HYMENOPHYLLUM POLYANTHOS Sw. (Fig. 39)

In Journ. Bot. Schrad. **1800**. 102 (1801).

A species of worldwide occurrence in the tropics; in Dominica the commonest species of the genus, and found chiefly in humid forests at middle and upper elevations—La Chaudière (3521, 3677), Laudat (1796), Morne Anglais (155, 2293), Morne Negre Maron (1072), Morne Nichols (1916), Morne Plat Pays (1680), Morne Trois Pitons (156, 157), Pegoua River Valley (3442), Sylvania (1104); also collected by others at the Freshwater Lake, Boeri Lake, Homewood, Macoucherie Ridge, and the Roseau Valley.

4. HYMENOPHYLLUM HIRSUTUM (L.) Sw.

In Journ. Bot. Schrad. 1800. 99 (1801) as to name. *Hymenophyllum ciliatum* Sw., Griseb. Fl. Br. W.I.I. 659 (1864); Br. & Wils. Bot. P.R. vi. 506 (1926). *Trichomanes hirsutum* L. Sp. Pl. 1098 (1753).

A species widespread in the American tropics; in Dominica a common epiphyte especially in the belt of mossy forests at higher elevations—Morne Anglais (158, 2264), Morne Diablotin (2825), Morne Negre Maron (1054), Morne Plat Pays (1673), Morne Trois Pitons (159), Roseau Valley Waterfalls (2024): the species has also been collected or noted by Domin at Laudat, the Lakes, at Homewood, and on the Macoucherie River and Range.

5. HYMENOPHYLLUM LATIFRONS v. d. Bosch.

In Ned. Kruid. Arch. iv. 407 (1859).

A rare epiphytic species known only from Guadeloupe, Dominica, Martinique, and St. Vincent; occurring in mossy forests at highest elevations—Morne Trois Pitons (1412 also collected on Morne Diablotin by Fishlock (34, and 50 in part).

The species has been discussed by me in detail elsewhere (22).

6. CYATHEACEAE—Tree-Fern Family

Key to Genera

Sori obviously indusiate.

Indusia either cup-shaped with even margins or globose and at first entirely enclosing the sporangia (later rupturing irregularly, the divisions persistent to fugacious).....1. *Cyathea*

Indusia proximal in attachment, somewhat semicircular, usually scale-like, often lobed or cleft, never enclosing the sporangia.....2. *Hemitelia*
Sori non-indusiate.....3. *Alsophila*

1. CYATHEA J. E. Smith

Key to Species

Armed tree-ferns (with sharp dark spines on the rhizomes, croziers, and stipes).....1. *C. imrayana*

Unarmed tree-ferns.

Middle pinnules 10–14 cm. long, long-attenuate; segments 20–32 pairs, linear-oblong, subfalcate, with 10–13 pairs of veins.....2. *C. arborea*

Middle pinnules 3–4 cm. long, shortly acute; segments 10–12 pairs, oblong, with 4–5 pairs of veins.....3. *C. tenera*

1. CYATHEA IMRAYANA Hook. (Fig. 41)

Sp. Fil. i. 18, t. 9b (1844), exclusive of Jamaica variety.

Endemic in Guadeloupe, Dominica (type locality), and Martinique (erroneously reported by Fée from Hispaniola); in Dominica uncommon though locally frequent on borders of wet forests at middle and higher elevations—Laudat (1848), Morne Plat Pays (1669).

This species reaches 6 meters in height with a caudex 10–15 cm. in diameter. The caudex and petioles are armed with wicked prickles. The individual fronds average 2 meters long, are broadest above the middle and possess about 11 pairs of pinnae. The leaf tissue is dark green above but pale below while the midribs of the pinnae and pinnules are very scaly below.

2. *CYATHEA ARBOREA* (L.) J. E. Smith (Fig. 42)

In Mém. Acad. Turin v. 417 (1793); Griseb. Fl. Br. W.I.I. 704 (1864); Br. & Wils. Bot. P.R. vi. 387 (1926). *Polypodium arboreum* L. Sp. Pl. 1092 (1753). *Cyathea serra* Willd., Griseb. loc. cit.

A tree-fern of the West Indies, also found in Mexico and Venezuela; the commonest tree fern in Dominica, abundant at middle elevations in ravines along streams, on forest borders, but chiefly inhabiting steep cut-over or abandoned slopes where it becomes weedy and gregarious—Laudat (1814), Lisdara (6, 8, 9, 2378, 2444), Pegoua River Valley (3438) Milton (2880), Morne Plat Pays (1711), Sylvania (7, 10, 1332).



FIG. 41. Young croziers of a tree fern, *Cyathea imrayana*, from Morne Plat Pays.

FIG. 42. The commonest Dominica tree fern, *Cyathea arborea*, near Sylvania.

FIG. 43. *Polypodium duale*, near Sylvania. A pencil at left. (Lower left).

FIG. 44. *Polypodium astrolepis*, at Sylvania. (Lower right).

The durable "trunks" of this species are sometimes used locally for posts or arbors or as supports for vanilla plants. The dry rhizome has been long used by the Caribs to preserve and to carry fire, for the "wood" will burn for hours without smoke or flame, generating much heat and leaving hardly any ash. For this reason the Caribs give the name *wātu hakuiyâ* ("voracious fire") to this species.

3. *CYATHEA TENERA* (J. E. Smith) Moore

Ind. Fil. 274 (1861); Griseb. Fl. Br. W.I.I. 704 (1864). *Alsophila tenera* J. E. Smith ex Hooker Sp. Fil. i. 49 (1844).

Primarily Lesser Antillean but also recorded from Cuba and Costa Rica; in Dominica rare, known only in forests on on forest borders at middle elevations around Laudat (1973, Lloyd 170).

2. HEMITELIA R. Br.

Key to Species

- Tall, truly arborescent tree-ferns; stipes armed with sharp or blunt spines, with dark lustrous concolorous brown scales at the base; fronds tripinnatifid, with short (1 cm. or less) segments. 1. *H. muricata*
- Low (the caudex 1 m. or less tall) subarborescent tree-ferns; stipes unarmed, with bicolorous brown scales at the base; fronds bipinnatifid, with long (1.5 cm. or more) acute to acuminate segments. 2. *H. grandifolia*

1. HEMITELIA MURICATA (Willd.) Fée

Gen. Fil. 350 (1850-1852). *Cyathea muricata* Willd. Sp. Pl. v. 497 (1810); Griseb. Fl. Br. W.I.I. 704 (1864).

Primarily Lesser Antillean (Guadeloupe to Martinique); in Dominica a common tree-fern of shaded ravines and moist forests at middle and higher elevations—Castle Bruce Trail (1191), La Chaudière (3698), Laudat (2075), Lisdara (11, 71, 2393, 2455, 2456, 2491), Milton (2916), Morne Anglais (12), Morne Plat Pays (1675), Sylvania (13, 1331).

Whereas *Cyathea arborea* is the common tree-fern of open slopes the present species is the common one of forests. The species is very variable. The old stipe bases, long-persistent on certain individuals, are early deciduous on others. Stipes also show all degrees of murication from sharp spines, which extend from the base to well above the first pair of pinnae, to very short dull murications (the commonest condition) which scarcely reach the basal pinnae. Stipes may also be lustrous and non-scurfy or dull-cinnamon-colored (most frequent on young fronds) and scurfy. Scales vary greatly in the number occurring at the stipe base. Fronds of identical size may have pinnae ranging from 7 to 15 pairs and terminal pinnae may be large or small.

2. HEMITELIA GRANDIFOLIA (Willd.) Spreng.

Syst. Veg. iv. 125 (1827). *Cyathea grandifolia* Willd. Sp. Pl. v. 490 (1810). *Hemitelia imrayana* Hook., Griseb. Fl. Br. W.I.I. 706 (1864).

A tree fern of the Lesser Antilles ranging from St. Kitts to Martinique; in Dominica common in moist woodlands and forests at middle elevations—Laudat (1814), Lisdara (8, 9, 2378), Pegoua River Valley (3438), Morne Plat Pays (1711), Sylvania (10, 1332).

Hemitelia kohautiana (Presl) Kunze, a closely related species known from Guadeloupe and Martinique, is to be expected in Dominica. It differs from the present plant in its rounded (non-acuminate) segments and narrow pinnae (2.5-5 cm. broad).

3. ALSOPHILA R. Br.

1. ALSOPHILA sp.

A specimen (3420) of an undetermined species of this genus was collected in moist forests near the Pegoua River. Apparently rare.

7. POLYPODIACEAE—Polypody Family

Key to Genera

- a. Sporangia borne upon the leaf-tissue of special fertile blades or upon their greatly modified, reduced parts.
- b. Sterile blades simple and entire.
- Veins free, or, in a few species, casually joined toward the margin
..... 1. *Elaphoglossum*

- Veins all united in regular areoles.
 Fronds articulate, ascending, paleaceous; fertile blades reduced, densely sporangiate.....2. *Hymenodium*
 Fronds not articulate, pendent, naked; fertile blades not reduced, the sporangia borne intermittently in groups, mainly within the areoles.....6. *Anelium*
- b. Sterile blades pinnate or palmately dissected.
 Plants mosslike, intricate; sterile blades reniform, palmately divided, usually flabellate-multifid.....3. *Rhipidopteris*
 Plants not mosslike; sterile blades elongate, simply pinnate.
 Rhizomes erect, fibrous-woody, often massive.
 Ferns of open coastal swamps; fertile and sterile pinnae conform; areoles uniform in size.....4. *Acrostichum*
 Ferns of forested mountain ravines; fertile pinnae not conforming with sterile, linear; areoles not uniform in size.....5. *Neurocallis*
 Rhizomes scandent or creeping, slender.
 Fertile blades greatly contracted, not leaf-like, the segments sporangiferous on all sides.....28. *Polybotrya*
 Fertile blades reduced but leaf-like, the segments sporangiferous only beneath.
 Plants subepiphytic; venation copiously areolate.....29. *Bolbitis*
 Plants epiphytic; veins free, at least beyond the transverse subcostal venule.....27. *Stenochlaena*
- a. Sporangia associated in definite lines or clusters (sori).
 c. Sori submarginal, borne at the end of the excurrent veins or upon an elongate intramarginal receptacle connecting them.
 Veins copiously anastomosing, the areoles with included veinlets.....10. *Paltonium*
 Veins free, or, if anastomosing, the areoles without included veinlets.
 Blades narrowly linear, simple, entire; sori non-indusiate.
 Areoles uniseriate.....7. *Vittaria*
 Areoles pluriseriate.....8. *Ananthacorus*
 Blades palmately lobed to several times pinnate; sori mostly indusiate.
 Sporangia borne on the under side of the entire modified margin or of sharply reflexed marginal lobules.....13. *Adiantum*
 Sporangia not so borne.
- d. Leaf margins revolute to broadly reflexed, mostly somewhat modified or giving rise to an introrse indusium.
 e. Sporangia terminating the veins, the sori separate in origin but often confluent laterally.
 Blades simple, palmately lobed; veins areolate...14. *Doryopteris*
 Blades 1-4 pinnate; veins free.
 Rhizomes hairy; primary pinnae few, subopposite.....15. *Hypolepis*
 Rhizomes paleaceous; primary pinnae numerous, alternate or digitate.
 Pinnae alternate; sori numerous, close, mostly confluent, protected by the common indusium or indusiform margin.....16. *Cheilanthes*
 Pinnae digitate; sori few, distant; indusia separate, formed by sharply reflexed, modified marginal lobules.....17. *Adiantopsis*
- e. Sporangia borne in a continuous line upon a veinlike receptacle connecting the vein-ends.
 Rhizomes non-paleaceous; plants succulent.....18. *Anisosorus*
 Rhizomes paleaceous; plants not succulent.
 Rhizomes wide-creeping; fronds distant; spores diplanate.....19. *Histiopteris*
 Rhizomes short-creeping to erect; fronds fasciculate; spores triplanate.....20. *Pteris*
- d. Leaf margins not revolute or reflexed; indusia extrorse, often joined laterally to an opposed, more or less modified leaf-lobule.
 Indusia attached only at sinus; pinnae articulate, deciduous.....34. *Nephrolepis*

- Indusia attached at base and sides, or at base only (if transversely linear); pinnae not articulate.
 Rhizomes densely hairy.....38. *Dennstaedtia*
 Rhizomes paleaceous.
 Fronds scandent, indeterminate; rachises usually spiny.....35. *Odontosoria*
 Fronds erect, determinate, rachises unarmed.
 Sori solitary, terminating the veins; indusia adnate laterally, forming soral pouches.....37. *Saccoloma*
 Sori usually continuous upon a transverse vein-like receptacle connecting the vein-ends; indusia transversely linear, attached only at base.....36. *Lindsaea*
- c. Sori dorsal upon the veins, or, if terminal, not submarginal.
 f. Sori greatly elongate, often irregular, following the course of the veins throughout; indusia wanting.
 Fronds nearly or quite exstipitate.....9. *Polytaenium*
 Fronds strongly stipitate.
 Blades subdimorphous, lacking white or yellow powder beneath.....21. *Hemionitis*
 Blades uniform, covered with white or yellow powder beneath.....22. *Pityrogramma*
- f. Sori roundish to linear, regular; indusia present or not.
 Fronds jointed to the rhizome; indusia wanting.
 Sori linear, consisting of a double costal line of sporangia, early confluent.....11. *Cochlidium*
 Sori roundish or oval, usually distinct.....12. *Polypodium*
 Fronds not jointed to the rhizome; indusia mostly present.
- g. Sori elliptical to narrowly linear; indusia lateral.
 h. Sori numerous, solitary on the lateral veins.
 Indusia at least partially double; scales with elongate cells, the walls equally thickened.....23. *Diplazium*
 Indusia single; scales clathrate, the cells with thickened lateral walls.
 Pinnae cordate-clasping; veins areolate.....24. *Hemidictyum*
 Pinnae not cordate-clasping; veins free.....25. *Asplenium*
- h. Sori a pair to each pinna, borne upon a transverse veinlet connecting the lateral veins.....26. *Blechnum*
- g. Sori roundish, reniform, lunate, or hippocrepiiform, rarely elliptical; indusia (if present) globose, centrally peltate, or attached at sinus.
 Fronds strongly jointed to long stipelike phyllopodia.....33. *Oleandra*
 Fronds not jointed.
- i. Pinnae articulate, deciduous.
 Sori dorsal; indusia entire, centrally peltate...30. *Cyclopettis*
 Sori terminal; indusia attached at the deep or shallow sinus.....34. *Nephrolepis*
- i. Pinnae not articulate, persistent.
 Veins free or partly connivent, or, if anastomosing, the areoles subequal and arranged in 1 or 2 regular rows...31. *Dryopteris*
 Veins copiously anastomosing, the areoles irregular and unequal.....32. *Tectaria*

1. ELAPHOGLOSSUM Schott*

Key to Species**

- a. Vein-ends clavate, not reaching the margin; veins distant, 3-6 per cm.; leaf tissue herbaceous to thin-chartaceous; sterile fronds with paleaceous margins (except in *E. feei*), the scales subulate to setiform; fertile blades shorter than the sterile.

*Reference Morton C. V. Notes on Elaphoglossum—II. The Species of the French West Indies. Am. Fern Journ. xxxviii. 202-214 (1948).

**Species in parentheses occur in the neighboring French islands and may be expected in Dominica.

- b. Fronds distant, the rhizome very slender, widely repent. Blades crenulate, scaleless.....1. *E. feei*
- b. Fronds caespitose or subcaespitose, the rhizome erect to short creeping.
- c. Stipes wanting or very short, not more than one-fourth as long as the blade; blades long-decurrent at base; rhizome scales 5-12 mm. long, crispate, strongly toothed.....2. *E. apodum*
- c. Stipes half as long as the blade or more; blades only slightly decurrent; rhizome scales 2-7 mm. long, not crispate, entire to denticulate.
- d. Fertile blade oval to orbicular, with scales among the sporangia.....(*E. pusillum*)
- d. Fertile blades oblong, with setiform scales among the sporangia.....3. *E. plumieri*
- a. Vein-ends not or only slightly clavate, reaching the margin or nearly so; veins mostly closer, 5-17 per cm.; leaf tissue chartaceous to coriaceous; sterile fronds with naked or paleaceous margins, if paleaceous the scales not subulate, except in *E. erinaceum*.
- e. Stipes bearing large spreading scales 6-12 mm. long; margins of sterile fronds with two regularly imbricate rows of conspicuous, rounded, cordate-based, appressed scales.....(*E. decoratum*)
- e. Stipes naked or with smaller scales; margins naked or the scales spreading, not regularly imbricate.
- f. Sterile blades with spreading, marginal and costal, subulate scales, the leaf surface only microscopically paleaceous.....4. *E. erinaceum*
- f. Sterile blades with naked margins or, if paleaceous, the leaf surface also conspicuously paleaceous.
- g. Sterile blades emarginate and proliferous at apex.....(*E. undulatum*)
- g. Sterile blades not emarginate or proliferous.
- h. Lower surface of the sterile blades conspicuously paleaceous.
- i. Scales of the lower surface reddish, very numerous and conspicuously imbricate.....(*E. vestitum*)
- i. Scales of the lower surface whitish, fewer, not imbricate, leaving much of the leaf surface exposed.....5. *E. boryanum*
- h. Lower surface of the sterile blades apparently naked or sometimes with inconspicuous, dissected, hairlike scales.
- j. Rhizome wide-creeping, the fronds distant.....6. *E. scandens*
- j. Rhizome erect to short-creeping.
- k. Rhizomes 1.5-2 mm. thick, the scales minute (about 2 mm. long), blackish.....7. *E. glabellum*
- k. Rhizomes thicker, the scales larger and paler.
- l. Sterile fronds nearly exstipitate.
- Rhizome scales orange-brown, 2 cm. long or more; sterile blades coriaceous, the fertile very much shorter.....8. *E. herminieri*
- Rhizome scales fuscous, 2-4 mm. long; sterile blades thinner, the fertile subequal to the sterile.....9. *E. rigidum*
- l. Sterile fronds obviously stipitate.
- m. Sterile fronds paleaceous beneath when young, the scales dissected, hairlike; blades resinous-dotted beneath.....10. *E. dussii*
- m. Sterile fronds only microscopically paleaceous beneath; blades not resinous dotted.
- n. Margins of sterile blades repand, subscarios; vein-tips transversely arcuate at apex, sometimes joined.....(*E. longifolium*)
- n. Margins of sterile blades plane, cartilaginous; vein-ends free.
- Rhizome scales 2 cm. long or more.....(*E. alismifolium*)
- Rhizome scales shorter.
- Rhizome scales conspicuous; frond apex acute to short acuminate.....11. *E. maxonii*
- Rhizome scales shorter and darker; frond apex obtuse.....12. *E. martinicense*

1. ELAPHOGLOSSUM FEEI (Bory) Moore

Ind. Fil. p. xvi. (1857). *Acrostichum feei* Bory ex Fée, Mém. Foug. ii. 48 (1845); Griseb. Fl. Br. W.I.I. 677 (1864).

Endemic to Guadeloupe and Dominica where it is a common creep-

ing epiphyte in mossy forests at higher elevations—Morne Anglais (22, 2297), Morne Diablotin (2790).

2. ELAPHOGLOSSUM APODUM (Kaulf.) Schott

Gen. Fil. ad tab. 14 (1834); Br. & Wils. Bot. P.R. vi. 395 (1926). *Acrostichum apodum* Kaulf. Enum. Fil. 59 (1824); Griseb. Fl. Br. W.I.I. 675 (1864).

Found throughout the West Indies and in many parts of the continental tropics of America; in Dominica apparently not common, the single record being based on a Nicholls collection (193).

3. ELAPHOGLOSSUM PLUMIERI (Fée) Moore

Ind. Fil. 13 (1857). *Acrostichum plumieri* Fée Mém. Foug. ii. 50 (1845).

Apparently endemic in Guadeloupe, Dominica, and Martinique; in Dominica limited to the mossy-forest belt atop the higher volcanic peaks—Morne Anglais (20, 21, 4002), Morne Diablotin (2810), and Morne Trois Pitons (19, 1380).

4. ELAPHOGLOSSUM ERINACEUM (Fée) Moore

Ind. Fil. 9 (1857). *Acrostichum erinaceum* Fée Mém. Foug. ii. 41 (1845).

With wide occurrence in the West Indies and continental tropical America, but originally described from Guadeloupe; in Dominica rare, being known only from the gorge below the waterfalls in the Massacre River (1021) and the slopes of Morne Anglais (17A). The latter specimen was reported by me (22) as *Elaphoglossum hybridum* Bory, a species of the Old World.

5. ELAPHOGLOSSUM BORYANUM (Fée) Moore

Ind. Fil. 7 (1857). *Acrostichum boryanum* Fée Mém. Foug. ii. 40, pl. 1. (1845). *Elaphoglossum lloydii* Underwood ex Domin Pterid. Dominica 106, pl. 20, fig. 2 (1929).

A Lesser Antillean species known from St. Kitts, Guadeloupe, Dominica, and Martinique; in Dominica an epiphyte chiefly in wet forests at middle and higher elevations—Massacre River Falls (1350), Morne Trois Pitons (18); also recorded from the Couliabon Mountains (Imray 88), Laudat (*Lloyd* 321), Morne Diablotin (*Lloyd* 868, type of *Elaphoglossum lloydii*).

For a discussion of *E. lloydii* see (22).

6. ELAPHOGLOSSUM SCANDENS (Bory) Moore

Ind. Fil. 14 (1857). *Acrostichum scandens* Bory ex Fée Mém. Foug. ii. 33 (1845), not Raddi.

A creeping epiphyte of Guadeloupe, Dominica, and Martinique; in Dominica known from middle and higher elevations—Morne Nicholls (1953); also collected at Laudat (*Eggers* 1049) and in an unspecified locality (*Eggers* 600).

7. ELAPHOGLOSSUM GLABELLUM J. Smith

In Lond. Journ. Bot. i. 197 (1842); Br. & Wils. Bot. P.R. vi. 397 (1926).

Widespread in the Greater Antilles and tropical South America but in the Lesser Antilles known only from Dominica and Martinique;

in Dominica a common epiphyte of forest borders at middle elevations—Sylvania (1155), Syndicate (2623).

8. ELAPHOGLOSSUM HERMINIERI (Bory & Fée) Moore

Ind. Fil. xvi. (1857); Br. & Wils. Bot. P.R. vi. 396 (1926). *Acrostichum herminieri* Bory & Fée in Fée, Mém. Foug. ii. 43 (1845).

Widespread in tropical America; in Dominica recorded only from the Valley of the Pegoua River near Deux Branches (3112).

9. ELAPHOGLOSSUM RIGIDUM (Aubl.) Urban

Symb. Ant. ix. 374 (1925), as to name; Br. & Wils. Bot. P.R. vi. 398 (1926). *Elaphoglossum flaccidum* (Fée) Moore Ind. Fil. 356 (1862). *Polypodium rigidum* Aubl. Pl. Guian. ii. 963 (1775).

A species widespread in the West Indies but occurring also in continental tropical America; in Dominica known only from the mossy-forests atop Morne Anglais (2303). This fern has long been known as *E. flaccidum*.

10. ELAPHOGLOSSUM DUSSII Underwood

Ex Maxon in Br. & Wils. Bot. P.R. vi. 398 (1926).

A fern distributed in the West Indies from Hispaniola to Grenada; in Dominica one of the commonest species of the genus occurring chiefly at middle elevations—La Chaudière (3636), Lisdara (14), Morne Anglais (15), Pegoua River Valley (3444), Sylvania (16); also reported by Domin from Homewood and Laudat.

According to Maxon the species has been generally confused with *E. petiolatum* (Sw.) Urban.

11. ELAPHOGLOSSUM MAXONII Underwood

Ex Morton in Am. Fern Journ. xxix. 12 (1939).

A species of the Greater Antilles, known in the Lesser Antilles only from Dominica where it has been collected at Sylvania (1302).

The Dominica records for *Elaphoglossum pteropus* C. Chr., a related South American species, are probably referable to the present species. *E. pteropus* is not recorded with certainty north of Trinidad and Tobago. Domin states that Imray 245 represents this species as well as Eggers 11 and 1049. *E. maxonii* has been described since the publication of Domin's work.

Morton distinguishes these two species as follows:—"The fertile blades exceed the sterile in length in *E. pteropus*, an important specific character in *Elaphoglossum*; the reverse is true in *E. maxonii*. Also in *E. pteropus* the sterile blades are long-decurrent and form a wing nearly to the base of the stipe, whereas in *E. maxonii* the blades are slightly decurrent, the stipe being non-alate for most of its length. The rhizome of *E. maxonii* is thick and bears a conspicuous apical tuft of scales. The scales throughout the rhizome are mostly persistent. On the other hand, the rhizome of *E. pteropus* is relatively slender, and the scales are smaller, fewer, and more readily deciduous."

12. ELAPHOGLOSSUM MARTINICENSE (Desv.) Moore

Ind. Fil. 11 (1857). *Elaphoglossum underwoodianum* Maxon in Br. & Wils. Bot. P.R. vi. 397 (1926). *Acrostichum martinicense* Desv. Ges. Naturf. Freund. Berl. Mag. v. 309 (1811).

A species ranging from Hispaniola and Puerto Rico through the Lesser Antilles to Grenada; in Dominica found in the rain forest belt at middle elevations—Pegoua River Valley (3434).

ADDITIONAL SPECIES REPORTED FROM DOMINICA

ELAPHOGLOSSUM LATIFOLIUM (Sw.) J. Smith

In Lond. Journ. Bot. i. 197 (1842); *Acrostichum latifolium* Sw. Prodr. 128 (1788); Griseb. Fl. Br. W.I.I. 677 (1864).

Apparently widespread in the West Indies (Greater Antilles) and tropical America. I have seen no material from Dominica but, according to Domin, specimens have been collected by Eggers (1041), Imray (82), and Nicholls (255). These collections probably represent the species *Elaphoglossum alismifolium* (Fée) Moore, which occurs on the neighboring French isles and which may be found in the key above.

ELAPHOGLOSSUM LEPIDOTUM (Willd.) J. Smith

Cat. Kew Ferns 1856. *Acrostichum lepidotum* Willd. Sp. Pl. v. 102 (1810).

A small, densely scaly species of South America and not authentically known in the Lesser Antilles. Grisebach reports this fern from Dominica under the name, *Acrostichum muscosum* Sw. Domin notes that a sheet of Imray 101, from the "Couliabon Mountains", bears the name "*Acrostichum muscosum*" but "is surely *Elaphoglossum perelegans*". This is possibly the basis of the Dominica record for *Elaphoglossum lepidotum*.

ELAPHOGLOSSUM PERELEGANS (Fée) Moore

Ind. Fil. p. xvi (1857). *Acrostichum perelegans* Fée Mém. Foug. ii. 55 (1845).

A species reported from Hispaniola, Guadeloupe, Dominica, Martinique, Venezuela, Brazil, and Peru. Possibly identical to the preceding. The Dominica records are based on Imray 101 from the "Couliabon Mountains" and Nicholls 181 from an unknown locality. Hodge 17 from Morne Anglais may be referable to this species.

2. HYMENODIUM Fée

1. HYMENODIUM CRINITUM (L.) Fée

Mém. Foug. ii. 90 (1845); Br. & Wils. Bot. P.R. vi. 400 (1926). *Acrostichum crinitum* L. Sp. Pl. ii. 1068 (1753); Griseb. Fl. Br. W.I.I. 675 (1864).

A West Indian species, also recorded from Costa Rica and Mexico; in Dominica occasional in humid forests at middle elevations. I have seen no Dominica material but a Lloyd collection (318) was made at Laudat, and Domin records the species from the same region as well as from Homewood and the Macoucherie Ridge.

3. RHIPIDOPTERIS Schott

1. RHIPIDOPTERIS PELTATA (Sw.) Schott

Gen. Fil. under pl. 14 (1834); Griseb. Fl. Br. W.I.I. 675 (1864); Br. & Wils. Bot. P.R. vi. 401 (1926). *Osmunda peltata* Sw. Prodr. 127 (1788).

A colonial, delicate, creeping species found throughout the West Indies and on the continent from Mexico to northern South America;

in Dominica infrequent on decayed logs in humid forests at middle and upper elevations—Laudat (1784), Morne Diablotin (2803), Morne Plat Pays (1731).

4. ACROSTICHUM L.

1. ACROSTICHUM DANAEOFOLIUM Langsd. & Fisch. (Fig. 40)

Icon. Fil. i. 5 (1810); Br. & Wils. Bot. P.R. vi. 402 (1926).

A large terrestrial fern of tropical and subtropical America inhabiting brackish marshes and low ground along watercourses at sea-level—Blenheim (23), Calibishie, Indian River (3578), Portsmouth (24).

Acrostichum aureum L., differing from the present species in having fertile blades in which only the upper pinnae are fertile, is recorded from Martinique and may be expected in Dominica.

5. NEUROCALLIS Fée

1. NEUROCALLIS PRAESTANTISSIMA Fée

Mém. Foug. ii. 89 (1845); *Lomagramme praestantissima* (Fée) Griseb., Fl. Br. W.I.I. 678 (1864).

A large terrestrial fern limited in distribution to the higher isles of the Lesser Antilles, and Colombia; in Dominica found in ravines in moist forests at middle elevations—Morne Diablotin (2786); also recorded by Domin from near Homewood, from forests in the Layou Valley, and from the Macoucherie Ridge.

6. ANETIUM Splitg.

1. ANETIUM CITRIFOLIUM (L.) Splitg.

Tidj. Nat. Gesch. vii. 395 (1840); Griseb. Fl. Br. W.I.I. 678 (1864); Br. & Wils. Bot. P.R. vi. 402 (1926). *Acrostichum citrifolium* L. Sp. Pl. 1067 (1753).

A lax epiphyte of the rainforest belt and apparently rather rare in Dominica but found in much of the Caribbean area. I have seen no Dominica material but Domin records it from "mountain forests near Homewood."

7. VITTARIA J. E. Smith

Key to Species

Rhizome scales dark brown, with long filiform tips, these unicostate; spores diplanate.....1. *V. lineata*
Rhizome scales yellowish brown or castaneous, attenuate, pluricostate almost to the tip; spores triplanate.....2. *V. filifolia*

1. VITTARIA LINEATA (L.) J. E. Smith

In Mém. Acad. Turin v. 413 (1793); Griseb. Fl. Br. W.I.I. 671 (1864); Br. & Wils. Bot. P.R. vi. 403 (1926). *Pteris lineata* L. Sp. Pl. 1073 (1753).

Of widespread occurrence in the tropics and subtropics from Florida to Paraguay; in Dominica occasional at lower to middle elevations—Grand Bay (138), La Chaudière (3629), Laudat (139), Morne Colla Anglais (1175).

2. VITTARIA FILIFOLIA Fée

Mém. Foug. iii. 20 (1851–52); Br. & Wils. Bot. P.R. vi. 403 (1926).

With scattered distribution in the West Indies and on the continent

from Mexico to Brazil; in Dominica an occasional epiphyte at middle elevations—Pegoua River Valley (3455), Sylvania (3986), Syndicate (2719, 2723, 3992).

8. ANANTHACORUS Underw. & Maxon

1. ANANTHACORUS ANGUSTIFOLIUS (Sw.) Underw. & Maxon

In Contrib. U. S. Nat. Herb. x. 487 (1908); Br. & Wils. Bot. P.R. vi. 404 (1926). *Pteris angustifolia* Sw. Prodr. 129 (1788). *Taenitis angustifolia* Spreng., Griseb. Fl. Br. W.I.I. 671 (1864).

An epiphytic fern with wide dispersal in tropical America; found on tree trunks, especially along streams—Laudat Waterfalls (25), Morne Brule (26), Mt. Joy (1294), Roseau Valley Falls (1991).

9. POLYTAENIUM Desv.

Key to Species

Sporangia slightly sunken in simple or branching lines.....1. *P. dussianum*
Sporangia superficial in irregular, flexuous or branching lines.....2. *P. feei*

The genus *Hecistopteris*, as represented by the species *Hecistopteris pumila* (Spreng.) J. Smith, occurs in Guadeloupe and may be expected in the rain forest area of Dominica. In the key to the genera of Polypodiaceae this species would run down to *Polytaenium* from which it may be easily separated by its minute (1–2 cm. long) cuneiform ironds.

1. POLYTAENIUM DUSSIANUM Benedict

In Bull. Torrey Bot. Club xxxviii. 169 (1911). *Antrophyum dussianum* Benedict in Bull. Torrey Bot. Club xxxiv. 453 (1907).

A species with scattered distribution throughout the West Indies. The single Dominica record is based on a Lloyd collection (918) cited by Benedict without data.

2. POLYTAENIUM FEEI (Schaffn.) Maxon

In Br. & Wils. Bot. P.R. vi. 405 (1926). *Antrophyum feei* Schaffn. ex Fée Mém. Foug. vii. 42 (1857). *Antrophyum lanceolatum* Kaulf., Griseb. Fl. Br. W.I.I. 672 (1864).

Common in the West Indies and on the continent from Mexico to northern South America; in Dominica commonest at middle to higher elevations—Fon Pays (2866), Laudat (1977), Lisdara (2398), Morne Anglais (27), Morne Colla Anglais (1179, 1183, 3968), Morne Diablotin (2780), Roseau Valley Falls (1998), South Chiltern (1555), Sylvania (28, 1158), Syndicate (2724).

10. PALTONIUM Presl

1. PALTONIUM LANCEOLATUM (L.) Presl

Epim. Bot. 156 (1851); Br. & Wils. Bot. P.R. vi. 406 (1926). *Pteris lanceolata* L. Sp. Pl. 1073 (1753). *Taenitis lanceolata* Kaulf., Griseb. Fl. Br. W.I.I. 671 (1864).

A West Indian epiphytic fern known also from Florida and from Honduras; in Dominica found at lower and middle elevations usually under rather open conditions—Morne Colla Anglais (1180), Ridgefield (2189); also collected by Cooper (92) at Sylvania.

11. COCHLIDIUM Kaulf.

1. COCHLIDIUM SEMINUDUM (Willd.) Maxon

In Br. & Wils. Bot. P.R. vi. 407 (1926). *Pleurogramme linearis* Presl., Griseb. Fl. Br. W.I.I. 672 (1864). *Blechnum seminudum* Willd. Phytogr. 13, pl. 8, f. 2 (1794).

An epiphytic species of the West Indies and northern South America; very common on tree trunks at all elevations in Dominica—Castle Bruce Trail (2605), Grand Bay (30). Laudat (1746), Lisdara (2394), La Chaudière (3673), Morne Anglais (31, 2287, 2310). Morne Bruce (29), Morne Diablotin (2822), Morne Nicholls (1918), Morne Plat Pays (1724), Morne Trois Pitons (1414), Pegoua River Valley (3484), Sylvania (32), Syndicate Plantation (2624).

12. POLYPODIUM L.

Key to Species*

- a. Veins free (casually joined in No. 3).
 - Blades simple and entire, the margins dark-sclerotic.....1. *P. limbatum*
 - Blades serrate or lobed to pinnatisect, at least below, the margins not dark-sclerotic.
 - Sori confluent along the rachis, confined to the caudiform apex2. *P. duale*
 - Sori more or less distinct, not borne in a confluent apical line.
 - Blades crenately lobed half-way to the rachis or less, spongiose3. *P. trifurcatum*
 - Blades pinnatisect or nearly so, not spongiose.
- b. Segments monosorous.
 - Blades scarcely pubescent.....4. *P. hartii*
 - Blades conspicuously reddish-setose with long hairs.
 - Veins of the fertile segments forked.
 - Stipe alate to the base.....5. *P. knowltoniorum*
 - Stipe not alate at the base.....6. *P. taenifolium*
 - Veins of the fertile segments not forked (fertile spur obsolete)7. *P. serricula*
- b. Segments bearing several sori.
 - c. Veins simple or with rudimentary fertile spurs.
 - Blades decurved at base; fertile veins gibbous, the sori dorsal8. *P. asplenifolium*
 - Blades not decurved; fertile veins straight, the sori terminal.
 - Sori deeply impressed.
 - Fronds lax; larger segments 5 mm. or less long...9. *P. jubaeforme*
 - Fronds more or less rigid; larger segments 10–15 mm. long10. *P. tenuiculum*
 - Sori superficial.
 - Fronds pendent; segments ovate-oblong, membranous.
 - Fronds conspicuously hairy with soft, brown hairs11. *P. mollissimum*
 - Fronds essentially glabrous.....12. *P. flabelliforme*
 - Fronds suberect; segments linear, herbaceous.....(*P. taxifolium*)
 - c. Veins 1 to 4 times forked.
 - Segments 2–8 mm. broad, dilatate or surcurrent, joined; sori round13. *P. pectinatum*
 - Segments 8–22 mm. broad, adnate, distinct; sori oval or elliptical14. *P. dissimile*
- a. Veins anastomosing, the areoles in 1 to several rows.
 - d. Areoles uniform, each with a single free, straight, included venule, the sori terminal upon the latter.
 - Blades simple and entire.
 - Rhizome naked.....15. *P. glaucophyllum*
 - Rhizome paleaceous.....16. *P. piloselloides*

*Species in parentheses occur in the adjoining French islands and may be expected in Dominica.

- Blades pinnatisect.
 Fronds freely paleaceous beneath.....17. *P. polypodioides*
 Fronds nearly or quite devoid of scales.
 Rhizomes sinuous, 2-5 mm. thick.....18. *P. loriceum*
 Rhizomes cylindrical, 8-14 mm. thick.
 Fronds erect, essentially glabrous.....19. *P. triseriale*
 Fronds suberect to pendent, both surfaces pubescent.....20. *P. chnoodes*
- d. Areoles not uniform, the costal ones (*P. angustifolium* excepted) without an included venule, some of the others with 1 to several, free or anastomosing venules; sori various in position.
- e. Blades of a linear type, simple and entire.
 f. Venation subequal; strong lateral veins not developed.
 Costal areoles mostly with an included venule; rhizomes short-creeping.....(*P. angustifolium*)
 Costal areoles without included venules; rhizomes wide-creeping.
 Blades lepidote; sori elliptical to linear.....21. *P. astrolepis*
 Blades naked; sori round.....22. *P. lycopodioides*
- f. Venation very unequal; numerous oblique or divergent, elevated lateral veins excurrent nearly to the margin.
- g. Included venules excurrent, parallel, simple, the sori terminal upon them in 2-4 rows between the main veins.
 Blades repand, often corrugate, acute or acutish at apex.....(*P. latum*)
 Blades usually plane, acuminate or attenuate at apex.
 Rhizome short creeping; leaves coriaceous....23. *P. phyllitidis*
 Rhizome long creeping; leaves herbaceous to subcoriaceous.....24. *P. repens*
- g. Included venules recurved or pendent, mostly branched, sterile; sori compital, uniseriate between the main veins.....25. *P. crassifolium*
- e. Blades broad, deeply pinnatifid.
 Stipes wiry, dull brown; segments 5-8 mm. broad, the costa concealed.....(*P. sectifrons*)
 Stipes stout, glossy brown; segments 1.5-5 cm. broad, the costa elevated.....26. *P. aureum*

1. POLYPODIUM LIMBATUM (Fée) Maxon

In Bull. Torrey Bot. Club xlii. 222 (1915). *Grammitis limbata* Fée, Gen. Fil. 233 (1852).

A very rare epiphyte known only from Guadeloupe, Dominica, and St. Vincent; in Dominica limited to the belt of mossy forests atop Morne Trois Pitons (1437) where because of its tiny size and habit of growing among epiphytic mosses it may be easily overlooked.

2. POLYPODIUM DUALE Maxon (Fig. 43)

In Contrib. U. S. Nat. Herb. xvi. 61 (1912); Br. & Wils. Bot. P.R. vi. 409 (1926). *Xiphopteris serrulata* Kaulf., Griseb. Fl. Br. W.I.I. 703 (1864).

An epiphyte widespread in the tropics of America and Africa; common in Dominica at middle and upper elevations—Laudat (1811), Morne Anglais (2292), Morne Diablotin (2791), Morne Nicholls (1917), Morne Trois Pitons (1399), Pegoua River Valley (3449), between Riversdale & Hatton Garden (40), Sylvania (41, 1131), Syndicate (2626).

3. POLYPODIUM TRIFURCATUM L.

Sp. Pl. 1084 (1753); Br. & Wils. Bot. P.R. vi. 410 (1926).

A species of the West Indies and the continental tropics from Guatemala to Bolivia growing at middle and higher elevations on

mossy rocks and tree trunks; in Dominica apparently rare, the only record being the listing of the island by Maxon in his account of the ferns of Puerto Rico.

4. *POLYPODIUM HARTII* Jenman

In Journ. Bot. xxiv. 272 (1886).

A species known only from Jamaica, Guadeloupe, Dominica, Martinique, St. Vincent, and Grenada; in Dominica rare (probably overlooked because of its minute size) as a tiny epiphyte in mossy forests at higher elevations—Castle Bruce Trail (1229), Freshwater Lake (1837), Morne Anglais (2290), Morne Diablotin (3962), Morne Micotrin (2088), Morne Plat Pays (4006), Morne Trois Pitons (1436).

5. *POLYPODIUM KNOWLTONIORUM* Hodge (Fig. 45)

In Am. Fern Journ. xxxi. 105 (1941).

A Lesser Antillean species endemic in Guadeloupe and Dominica; in the latter island limited as a tiny epiphyte to the mossy forests at highest elevations—Morne Trois Pitons (54, 1431, 1404). The species is locally common atop Morne Trois Pitons where it grows in association with such species as *P. asplenifolium*, *P. tenuiculum*, *P. hartii*, *P. jubaeforme*, and *P. serricula*.

6. *POLYPODIUM TAENIFOLIUM* Jenman

In Bull. Bot. Dept. Jamaica II. iv. 114 (1898).

A species known in the West Indies from Jamaica to Trinidad; in Dominica very rare as an epiphyte in mossy forests at higher elevations—Morne Plat Pays (1666); also recorded by Domin from a ridge above the crater of the Boiling Lake.

7. *POLYPODIUM SERRICULA* Fée (Fig. 45)

Gen. Fil. 238 (1852).

Endemic in the Lesser Antilles (Guadeloupe, Dominica, and Martinique); in Dominica limited to the mossy forests at highest elevations—Morne Anglais (53, 2288, 3963), Morne Diablotin (2792), Morne Plat Pays (1683), Morne Trois Pitons (58, 3963). Collections of Lloyd (121 in part, 874, 897) have also been made on Morne Diablotin.

8. *POLYPODIUM ASPLENIFOLIUM* L.

Sp. Pl. 1084 (1753); Griseb. Fl. Br. W.I.I. 700 (1864); Br. & Wils. Bot. P.R. vi. 410 (1926). *Polypodium suspensum* L., Griseb. Fl. Br. W.I.I. 700 (1864). *Polypodium eggersii* Bak. in Hook. Icon. Pl. iii. 1671 (1886).

A variable species of the West Indies and the continental regions bordering on the Caribbean; in Dominica a common pendent epiphyte of middle and upper elevations—Castle Bruce Trail (3961), La Chaudière (3565), Laudat (1794), Lisdara (46), Morne Anglais (48, 2270), Morne Diablotin (2830), Morne Negre Maron (1063), Morne Plat Pays (1668, 1672), Morne Trois Pitons (47, 1403), Pegoua River Valley (3004), Sylvania (3835).

Polypodium suspensum was based on Martinique material of doubtful identification and has been considered by fern specialists as synonymous with the present species.

Polypodium eggersii Baker, described from Dominica on the basis of Eggers 937, seems scarcely separable from small forms of *Polypodium asplenifolium* and is here treated as a synonym.

9. *POLYPODIUM JUBAEFORME* Kaulf.

In Flora vi. 364 (1823); Br. & Wils. Bot. P.R. vi. 411 (1926). *Polypodium pendulum*, var. *jubiforme* Griseb., Fl. Br. W.I.I. 700 (1864).

A species found throughout the West Indies as well as in Panama and northern South America; in Dominica occasional as an epiphyte particularly in mossy forests at higher elevations—Castle Bruce Trail (1226), Morne Anglais (45, 2291), Morne Plat Pays (1602, 1667, 1691), Morne Trois Pitons (1432), Pegoua River Valley (3478), Sylvania (3834).

10. *POLYPODIUM TENUICULUM* Fée

Gen. Fil. 239 (1852). *Polypodium grenadense* Jenman in Gard. Chronicle xv. 134 (1894).

Essentially Lesser Antillean in distribution; in Dominica rather common as an epiphyte on trunks of large rain forest trees at middle to higher elevations—Castle Bruce Trail (1227), Morne Trois Pitons (1433), Sylvania (1118, 3960), Syndicate (2619). This species has been overlooked, possibly because it is associated with and somewhat resembles *Polypodium asplenifolium* and *P. jubaeforme*.

11. *POLYPODIUM MOLLISSIMUM* Fée

Mém. Foug. xi. 47 pl. 12, f. 2 (1866); Br. & Wils. Bot. P.R. vi. 411 (1926).

Widely scattered in the West Indies and in Central America from Guatemala to Panama; in Dominica rare as a pendent epiphyte on trees of rain forests at middle elevations—Pegoua River Valley (3443). Domin reports it also from the Macoucherie Ridge.

12. *POLYPODIUM FLABELLIFORME* Poir.

Encycl. v. 519 (1804); Griseb. Fl. Br. W.I.I. 700 (1864).

A species of the West Indies and of South America from Venezuela to Peru; rare in Dominica at higher elevations where it occurs in the mossy forests—Morne Trois Pitons (1438).

13. *POLYPODIUM PECTINATUM* L.

Sp. Pl. 1085 (1753); Griseb. Fl. Br. W.I.I. 699 (1864); Br. & Wils. Bot. P.R. vi. 412 (1926).

A variable species with wide distribution in the tropics and sub-tropics from Florida to South America; in Dominica a common epiphyte in woodlands at lower to middle elevations—La Chaudière (3605), Laudat (56), Lisdara (56), Milton (2604), Morne Brule (57), Pegoua River Valley (3106), Roseau Valley Falls (1994), South Chiltern (1559), Sylvania (1151), Syndicate (2703).

14. *POLYPODIUM DISSIMILE* L.

Syst. Nat. ed. 10, ii. 1325 (1759); Griseb. Fl. Br. W.I.I. 699 (1864); Br. & Wils. Bot. P.R. vi. 413 (1926).

A fern of the West Indies and of the continent from Mexico to

northern South America; in Dominica not common and limited to middle and higher elevations—Morne Diablotin (2775). Unlocalized collections have also been made by Eggers (1089) and Imray (111).

15. *POLYPODIUM GLAUCOPHYLLUM* Kunze

In Linn. xx. 393 (1847).

An epiphyte clambering by greenish rhizomes over tree trunks in forests at middle elevations; rare in Dominica, the following representing the sole record—Morne Colla Anglais (1181).



FIG. 45. Two closely related epiphytic ferns from the summit of Morne Trois Pitons, *Polypodium serricula* (left) and *Polypodium knowltoniorum* (right). (Upper left).

FIG. 46. *Polypodium lycopodioides*, at Sylvania. (Lower left).

FIG. 47. *Tectaria trifoliata*, near Sylvania. (Upper right).

FIG. 48. *Blechnum occidentale*, at Lisdara. (Lower right).

16. *POLYPODIUM PILOSELLOIDES* L.

Sp. Pl. 1083 (1753); Griseb. Fl. Br. W.I.I. 701 (1864); Br. & Wils. Bot. P.R. vi. 413 (1926).

A wide-creeping epiphytic fern, essentially West Indian in dispersal but recorded also from eastern Guatemala; in Dominica common in rather open sites at lower to middle elevations—La Chaudière (3623), Lisdara (43), Roseau Valley Falls (2031), South Chiltern (1594), Sylvania (44).

17. *POLYPODIUM POLYPODIOIDES* (L.) Watt

In Canad. Nat. II xiii. 158 (1867); Br. & Wils. Bot. P.R. vi. 414 (1926). *Acrostichum polypodioides* L. Sp. Pl. 1068 (1753). *Polypodium incanum* Sw., Griseb. Fl. Br. W.I.I. 699 (1864).

Widespread throughout the American tropics and subtropics from the southern United States to Argentina and also in South Africa; apparently uncommon in Dominica the only record being based on Sieber (153) cited by Krug.

18. *POLYPODIUM LORICEUM* L.

Sp. Pl. 1086 (1753); Griseb. Fl. Br. W.I.I. 698 (1864); Br. & Wils. Bot. P.R. vi. 414 (1926).

A species of wide dispersal in tropical America; in Dominica a common epiphyte at middle and higher elevations—Laudat (1747). Massacre River Falls (1351), Morne Anglais (35), Pegoua River Valley (3958), Sylvania (1157). Domin also records the species from Breakfast River, Boeri Lake, Freshwater Lake, Grand Soufrière, Homewood, and the Macoucherie Ridge.

19. *POLYPODIUM TRISERIALE* Sw.

In. Journ. Bot. Schrad. 1800. 26 (1801). *Polypodium neriifolium* Schkuhr, Griseb. Fl. Br. W.I.I. 698 (1864). *Polypodium brasiliense* Poir. Encycl. v. 525 (1804).

A species with wide distribution in tropical America; in Dominica a common epiphyte at lower to middle elevations—La Chaudière (3647), Lisdara (59, 60), Ridgefield (2147), South Chiltern (1464, 1588), Sylvania (61, 62, 63). Domin also records it from the Freshwater Lake, Homewood, Laudat, Macoucherie Ridge, Morne Bruce, Portsmouth, and Roseau.

20. *POLYPODIUM CHNOODES* Spreng.

Neu. Entd. iii. 6 (1822); Griseb. Fl. Br. W.I.I. 698 (1864); Br. & Wils. Bot. P.R. vi. 415 (1926).

A species of the West Indies and continental countries bordering the Caribbean; in Dominica a common pendent epiphyte of lower and middle elevations—La Chaudière (3639), Lisdara (36), Pegoua River Valley (3432, 3433), Sylvania (37).

21. *POLYPODIUM ASTROLEPIS* Liebm. (Fig. 44)

Dansk. Vid. Selsk. Skrift. V. i. 185 (1849); Br. & Wils. Bot. P.R. vi. 416 (1926). *Polypodium elongatum* Mett., Griseb. Fl. Br. W.I.I. 702 (1864).

An epiphytic species of widespread occurrence in tropical America; in Dominica not uncommon at lower to middle elevations—Laudat (2063), Lisdara (2322), Morne Brule (39), Sylvaina (38, 1152); also recorded by Domin from Macoucherie Village, Portsmouth, and Roseau.

22. *POLYPODIUM LYCOPODIODES* L. (Fig. 46)

Sp. Pl. 1082 (1753); Griseb. Fl. Br. W.I.I. 702 (1864); Br. & Wils. Bot. P.R. vi. 417 (1926).

A pantropical epiphytic fern with worldwide dispersal; very common in Dominica creeping on tree trunks and limbs at lower to middle elevations—La Chaudière (3685), Laudat (2045), Lisdara (49), Marigot (50), Morne Brule (51), Mt. Joy (1280), Ridgefield (2145), South Chiltern (1482), Sylvania (52).

Polypodium heterophyllum L., a closely related species, has been ascribed to Dominica but very likely the specimen involved is one of the lax forms of *P. lycopodioides*.

23. *POLYPODIUM PHYLLITIDIS* L.

Sp. Pl. 1083 (1753); Griseb. Fl. Br. W.I.I. 702 (1864); Br. & Wils. Bot. P.R. vi. 417 (1926).

Widely distributed in this hemisphere from Florida to Uruguay; common in Dominica at lower to middle elevations—Hatton Garden (3034), La Chaudière (3510), Lisdara (34A) Marigot (34), Massacre River Falls (1349), Pegoua River Valley (3107, 3485), Ridgefield (2198), Roseau Valley Falls (2018), Syndicate (2763).

24. *POLYPODIUM REPENS* Aubl.

Hist. Pl. Guian. ii. 962 (1775).

A species of tropical America with very limited occurrence in the Lesser Antilles; apparently rare in Dominica in humid rainforests at middle elevations—Morne Diablotin (2782).

25. *POLYPODIUM CRASSIFOLIUM* L.

Sp. Pl. 1083 (1753); Griseb. Fl. Br. W.I.I. 703 (1864); Br. & Wils. Bot. P.R. vi. 418 (1926).

In one or more forms widespread throughout tropical America; in Dominica a common epiphyte at lower to middle elevations—Laudat (2040), Lisdara (33, 2339), Mt. Joy (1300), Ridgefield (2198), South Chiltern (1478), Sylvania (1150).

26. *POLYPODIUM AUREUM* L.

Sp. Pl. 1087 (1753); Griseb. Fl. Br. W.I.I. 698 (1864); Br. & Wils. Bot. P.R. vi. 419 (1926).

Widespread from Florida and the Bahamas to Argentina; in Dominica apparently uncommon the only collections those of Eggers (s.n.) and Nicholls (231) without locality cited by Domin. As elsewhere the species probably occurs on rocky banks and tree-trunks at lower to middle elevations.

ADDITIONAL SPECIES REPORTED FROM DOMINICA

POLYPODIUM SURUCHUCHENSE Hook.

Icon. Pl. 69 (1837); Griseb. Fl. Br. W.I.I. 698 (1864).

A species of the West Indies and on the continent from Costa Rica to Ecuador; apparently not common in Dominica, the only record being a specimen collected by Imray (112), cited by Domin.

13. ADIANTUM L.

Key to Species*

- a. Blades simply pinnate.
 - Blades freely rooting at tips.....1. *A. caudatum*
 - Blades not rooting at tips.
 - Sporangia borne in a continuous line along both margins of the pinnae(*A. macrophyllum*)
 - Sporangia in numerous separate, adjacent, oblong to linear sori.
 - Pinnae brownish green, lustrous on both sides, the sterile ones deeply and unevenly biserrate.....(*A. obliquum*)
 - Pinnae dark green above, very glaucous beneath, the sterile ones evenly serrulate-denticulate.....2. *A. petiolatum*
- a. Blades 2-5-pinnate.
 - b. Blades with an elongate terminal pinna essentially like the lateral ones.
 - Blades uniformly 2-pinnate.
 - Sporangia usually borne in a continuous line.
 - Segments 8-15 mm. long, the fertile ones oblong; sorus usually not reaching the roundish apex of the segment.....(*A. pulverulentum*)
 - Segments mostly 2-4 cm. long, narrowly rhombic; sorus usually extending around the acuminate or acutish tip.....(*A. villosum*)
 - Sporangia borne in numerous adjacent sori.
 - Rhizome wide-creeping, cordlike, about 2 mm. thick; pinnae of an oblong type; pinnules glaucous beneath, the fertile ones up to 4.5 cm. long, 7-15 mm. broad, the sterile ones denticulate.....3. *A. latifolium*
 - Rhizome creeping, nodose, 5-8 mm. thick; pinnae linear-lanceolate; pinnules not glaucous, the fertile ones 1.5-2.5 cm. long, 6-8 mm. broad, the sterile ones coarsely serrate.....4. *A. tetraphyllum*
 - Blades of mature plants commonly 3-pinnate at base.....(*A. cristatum*)
 - b. Blades decompound, lacking an elongate conform terminal pinna.
 - Blades of a lance-oblong type; pinnae sessile, a reduced basal pinnule invariably overlying the rachis.....(*A. concinnum*)
 - Blades of an ovate type; pinnae stalked.
 - Fronds lax, usually pendent; blades 2-3-pinnate, the segments not deciduous; rhizome cord-like, with entire scales.....5. *A. capillus-veneris*
 - Fronds ascending or erect-spreading; blades 3-5-pinnate, the segments deciduous; rhizome creeping, often massive, the scales not entire.
 - Scales bright yellowish-brown, ciliolate; blades lance-ovate; segments mostly obovate-cuneate.....6. *A. fragile*
 - Scales dark brown, with pale, ciliate or fimbriate margins; blades deltoid-ovate, subpentagonal; segments larger, mostly trapeziform or rhombic-oblong.....7. *A. tenerum*

1. ADIANTUM CAUDATUM L.

Mant. 308 (1771).

An Old World species locally naturalized along ditches and on walls— Mt. Joy (70), Roseau (Domin.).

2. ADIANTUM PETIOLATUM Desv.

In Ges. Naturf. Freund. Berlin Mag. v. 326 (1811); Br. & Wils. Bot. P.R. vi. 421 (1926). *Adiantum kauffussii* Kze., Griseb. Fl. Br. W.I.I. 663 (1864).

*Species in parentheses occur on the neighboring French islands and may be expected in Dominica.

A species of moist forests at lower and middle elevations, widely distributed in tropical America. I have seen no Dominica material but Domin records two Eggers collections (93 and 805) from the island.

3. *ADIANTUM LATIFOLIUM* Lam.

Encycl. i. 43 (1783); Br. & Wils. Bot. P.R. vi. 422 (1926).

A species of tropical America found in Dominica on grassy banks and half-shaded sites at lower elevations—Carib Reserve (3399), Hatton Garden (3051), Morne Brule (67, 68).

4. *ADIANTUM TETRAPHYLLUM* Humb. & Bonpl.

In Willd. Sp. Pl. v. 441 (1810); Griseb. Fl. Br. W.I.I. 664 (1864); Br. & Wils. Bot. P.R. 423 (1926).

A common fern of wide dispersal in tropical America; in moist forests at middle elevations—La Chaudière (3559), Lisdara (64, 65, 2493), Milton (2575, 2870), Ridgefield (2201), Roseau Valley Waterfalls (1993).

5. *ADIANTUM CAPILLUS-VENERIS* L. (Maidenhair Fern)

Sp. Pl. 1096 (1753); Griseb. Fl. Br. W.I.I. 666 (1864); Urb. Symb. Ant. ix. 348 (1925); Br. & Wils. Bot. P.R. vi. 424 (1926).

A pantropical fern common on walls and banks at lower and middle elevations. I have seen no material from Dominica but Domin collected this species at Roseau "on stone walls".

Adiantum cuneatum Langsd. & Fisch., a Brazilian maidenhair fern is cultivated in Dominica and may be found as an escape. Its fronds are broader and more dissected than the present species. Its indusia are rather small and rounded as opposed to the oblong, narrow indusia of *A. capillus-veneris*.

6. *ADIANTUM FRAGILE* Sw.

Prodr. 135 (1788); Griseb. Fl. Br. W.I.I. 666 (1864); Urb. Symb. Ant. ix. 348 (1925); Br. & Wils. Bot. P.R. vi. 425 (1926).

I have seen no material from Dominica but Domin records this West Indian species "on stone walls in Roseau".

7. *ADIANTUM TENERUM* Sw.

Prodr. 135 (1788); Griseb. Fl. Br. W.I.I. 666 (1864); Br. & Wils. Bot. P.R. vi. 425 (1926).

A species of the subtropics and tropics of America, inhabiting shaded hillsides and banks at lower to middle elevations—Laudat (1828), South Chiltern (1645).

14. DORYOPTERIS J. Sm.

1. *DORYOPTERIS PEDATA* (L.) Fée

Gen. Fil. 133 (1852); Br. & Wils. Bot. P.R. vi. 426 (1926). *Pteris pedata* L. Sp. Pl. 1075 (1753); Griseb. Fl. Br. W.I.I. 668 (1864).

Widespread throughout tropical America, inhabiting steep rocky banks and forested slopes at middle and higher elevations. A single Dominica record is based on Nicholls 185, cited by Krug (in Engl. Bot. Jahrb. xxiv. 99 (1897).)

15. HYPOLEPIS Bernh.

1. HYPOLEPIS REPENS (L.) Presl

Tent. Pter. 162 (1836); Griseb. Fl. Br. W.I.I. 666 (1864); Br. & Wils. Bot. P.R. vi. 426 (1926). *Lonchitis repens* L. Sp. Pl. 1078 (1753).

Of wide occurrence in tropical and subtropical America; in Dominica common as a pioneer on cleared lands, pastures, and the like at middle elevations—Laudat (1789), Milton (2566), Morne Anglais (2250).

16. CHEILANTHES Sw.

1. CHEILANTHES MICROPHYLLA Sw.

Syn. Fil. 127 (1806); Griseb. Fl. Br. W.I.I. 667 (1864); Br. & Wils. Bot. P.R. vi. 428 (1926). *Adiantum microphyllum* Sw. Prodr. 135 (1788).

A species of the southern United States, Mexico, and the West Indies. Found on walls, rocks, and drier open sites at lower elevations. Apparently uncommon in Dominica being recorded by Domin "in the variety *pubescens* on walls and dry places along the roads in Roseau".

17. ADIANTOPSIS Fée

1. ADIANTOPSIS RADIATA Fée

Gen. Fil. 145 (1850-52). *Cheilanthes radiata* J. Sm., Griseb. Fl. Br. W.I.I. 667 (1864).

A species of tropical America, occasional on drier sites at lower elevations—Morne Brule near Roseau (72). Domin states that this species is "very common in forests near Roseau". Collections have also been made by Eggers (527, 784) and Imray.

18. ANISOSORUS Trev.

1. ANISOSORUS HIRSUTUS (L.) Underw. & Maxon

Ex Maxon in Br. & Wils. Bot. P.R. vi. 429 (1926). *Lonchitis hirsutus* L. Sp. Pl. 1078 (1753). *Pteris laciniata* Willd., Griseb. Fl. Br. W.I.I. 669 (1864).

A large terrestrial fern of tropical America, the clumps up to 2 m. tall, inhabiting wet ravines and stream banks at middle elevations—Sylvania (73). Specimens were also collected by Imray (104) and Eggers (672, 893).

19. HISTIOPTERIS J. Sm.

1. HISTIOPTERIS INCISA (Thunb.) J. Smith

Hist. Fil. 295 (1875); Br. & Wils. Bot. P.R. vi. 431 (1926). *Pteris incisa* Thunb. Prodr. Fl. Cap. 171 (1800); Griseb. Fl. Br. W.I.I. 670 (1864).

A highly variable species occurring in the tropics of both the Old and New World; in Dominica probably occurring at middle and higher elevations, the records being based on specimens of which the localities are not given—Duss 1428, Eggers 975 and 1028.

20. PTERIS (Tourn.) L.

*Key to Species**

- a. Blades simply pinnate, the pinnae narrowly linear, not lobed or pinnatifid except in *P. multifida* where lower pinnae are 2-3 forked).
 - b. Fronds large (1.5-2.5 m. long, including stipe).....(*P. grandifolia* L.)
 - b. Fronds small (1 m. long or less, including stipe).
 - c. Lower pinnae 2-3 forked.....1. *P. multifida*
 - c. Lower pinnae unforked.
 - d. Pinnae very numerous, horizontal, articulate.....(*P. longifolia* L.)
 - d. Pinnae less numerous, more oblique in attachment, non-articulate.....2. *P. vittata*
- a. Blades 1-4-pinnate, at least the larger pinnae deeply pinnatifid.
 - e. Veins all free.
 - f. Pinnae 2-5 pairs, the axils somewhat prickly; lowermost vein of segments arising from the costa.....(*P. pungens* Willd.)
 - f. Pinnae 7-15 pairs, the axils non prickly; veins all arising from the costule.....(*P. quadriaurita* Retz.)
 - e. Veins (at least the basal pair) joined.
 - g. Basal pinnae 2-partite; basal veins joined in a narrow costal arc, the others free.....3. *P. biaurita*
 - g. Basal pinnae not 2-partite; veins joined in several rows of angular areoles.
 - h. Blades lance oblong, the basal pinnae no larger than the others, deeply pinnatifid or pinnately parted; basal veins uniarculate.....(*P. crassipes* Ag.)
 - h. Blades deltoid-ovate, pentagonal, fully 2-pinnate at base, the basal pinnae largest; basal veins 2-3 arcuate.....4. *P. altissima*

1. PTERIS MULTIFIDA Poir.

Encycl. v. 714 (1804).

A fern of eastern Asia which according to Domin has become established "on moist walls at Roseau, also near the house on the Macoucherie estate".

2. PTERIS VITTATA L.

Sp. Pl. 1074 (1753); Br. & Wils. Bot. P.R. vi. 436 (1926).

An Old World species which has escaped cultivation and become well established in many areas in the New World. I have seen this species on house walls in Roseau, and Maxon cites it as having been collected in Dominica. The species has been confused with *Pteris longifolia* L., which may also occur in Dominica.

3. PTERIS BIAURITA L.

Sp. Pl. 1076 (1753); Griseb. Fl. Br. W.I.I. 669 (1864); Br. & Wils. Bot. P.R. vi. 434 (1926).

Pantropical in distribution; in Dominica found at lower and middle elevations—Massacre River Falls (1344), Roseau Valley Falls (2015).

4. PTERIS ALTISSIMA Poir.

In Lam. Encycl. v. 722 (1804); Br. & Wils. Bot. P.R. vi. 435 (1926).

Widespread in tropical America; in Dominica found at lower and middle elevations—Castle Bruce Trail (1207), Milton (2917), Pegoua River Valley (3117), Salybia (3236). A collection made at Lisdara

*Species appearing within parentheses occur on one or both of the neighboring islands of Guadeloupe and Martinique and hence may be expected in Dominica.

(74) though resembling *P. altissima* represents another species of this genus but I have been unable to match it.

21. HEMIONITIS L.

1. HEMIONITIS PALMATA L.

Sp. Pl. 1077 (1753); Griseb. Fl. Br. W.I.I. 678 (1864); Br. & Wils. Bot. P.R. vi. 436 (1926).

A species found through the American tropics; in Dominica inhabiting grassy banks and open woody slopes at lower elevations—Morne Bruce (75); also recorded by Domin from the Roseau Valley and from Portsmouth.

22. PITYROGRAMMA Link

Key to Species

Blades densely covered beneath with bright yellow, waxy powder

.....1. *P. chrysophylla*

Blades covered beneath with white or whitish powder.

Fronds rather small, 20 cm. or less long.....2. *P. schaffneri*

Fronds large, 30–100 cm. long.....3. *P. calomelanos*

1. PITYROGRAMMA CHRYSOPHYLLA (Sw.) Link (Gold Fern)

Handb. Gewachs. iii. 19 (1833); Br. & Wils. Bot. P.R. vi. 438 (1926). *Acrostichum chrysophyllum* Sw. in Journ. Bot. Schrad. 1800. 14 (1801). *Gymnogramme chrysophylla* Kaulf. Griseb. Fl. Br. W.I.I. 679 (1864).

Widespread in the American tropics; in Dominica to be found on banks and disturbed sites at lower and middle elevations—Breakfast River (1896), Calibishie (3171), Carib Reserve (3293), Grand Bay (76), Laudat (1753), Milton (1089, 2923), Ridgefield (1921, 2195); also recorded by Domin from Freshwater Lake, Macoucherie River, and Point Michelle.

The species is variable and several varieties have been described by Domin. These may better be considered as forms.

2. PITYROGRAMMA SCHAFFNERI (Fée) Weatherby (Silver Fern)

In Contrib. Gray Herb. cxiv. 25 (1936). *Ceropteris schaffneri* Fée Mém. Foug. viii. 80 (1857).

A Lesser Antillean species; in Dominica at present known only from the road cut known as "Red Gully" on the Imperial Road between Mt. Joy and Sylvania (1290).

3. PITYROGRAMMA CALOMELANOS (L.) Link (Silver Fern)

Handb. Gewachs. iii. 19 (1833); Br. & Wils. Bot. P.R. vi. 438 (1926). *Acrostichum calomelanos* L. Sp. Pl. 1072 (1753). *Gymnogramme calomelanos* Kaulf., Griseb. Fl. Br. W.I.I. 679 (1864).

A widespread pantropical fern; in Dominica common, often as a pioneer on disturbed sites such as roadcuts, banks, etc., at lower and middle elevations—Laudat, at waterfalls (77), Marigot (79), Massacre River Falls (1342), Morne Bruce (78), Morne Brule (80), Ridgefield (2194), Scot's Head (1606), South Chiltern (1636), Sylvania (81, 82).

Pityrogramma tartarea (Cav.) Maxon, a related fern of wide distribution in tropical America, occurs on Guadeloupe and Martinique and so may be expected in Dominica. Imray 71 and Bradford 395

(not seen) probably represent this species though described by Domin as *P. caribaea*. The species may be distinguished as follows:—

Pinnules mostly acute, serrate or acutely pinnatifid; leaf-tissue chartaceous or membrano-herbaceous.....*P. calomelanos*
 Pinnules mostly rounded-obtuse, entire to obtusely pinnatifid; leaf-tissue coriaceous.....*P. tartarea*

23. DIPLAZIUM Sw.

Key to Species*

Blades simple.....1. *D. plantaginifolium*
 Blades 1-2 pinnate.

Pinnae crenate or sinuate-crenate.....(*D. centripetale* (Baker) Maxon)
 Pinnae crenately lobed to pinnate-pinnatifid.

Blades deltoid-ovate; pinnae strongly inequilateral at base; segments oblique.....2. *D. cristatum*

Blades of an oblong type; pinnae equilateral at base; segments spreading.

Pinnae mostly alternate; segments serrulate; indusia erose. 3. *D. striatum*

Pinnae subopposite; segments crenate-serrate; indusia deeply fimbriate-ciliate.....(*D. l'herminieri* Hieron.)

1. DIPLAZIUM PLANTAGINIFOLIUM (L.) Urban

Symb. Ant. iv. 31 (1903); Br. & Wils. Bot. P.R. vi. 440 (1926). *Asplenium plantaginifolium* L. Syst. Nat. ed. 10, ii. 1323 (1759). *Asplenium plantagineum* L., Griseb. Fl. Br. W.I.I. 684 (1864).

Found throughout the American tropics; in Dominica common in wet shaded ravines and forested slopes at middle elevations—Morne Colla Anglais near Sylvania (83, 1051), Morne Diablotin (2778).

2. DIPLAZIUM CRISTATUM (Desr.) Alston

In. Journ. Bot. lxxiv. 173 (1936). *Diplazium arboreum* (Willd.) Presl, Br. & Wils. Bot. P.R. vi. 442 (1926). *Asplenium shepherdii* Spreng., Griseb. Fl. Br. W.I.I. 685 (1864).

Found throughout the American tropics; in Dominica common at middle elevations as an epiphyte or frequently on wet rocks or cliff faces—Lisdara (2413), Morne Diablotin (2783), Ridgefield (2206), Roseau Valley Falls (2016), South Chiltern (1544), Sylvania (1093).

3. DIPLAZIUM STRIATUM (L.) Presl

Tent. Pter. 114 (1836); Br. & Wils. Bot. P.R. vi. 442 (1926). *Asplenium striatum* L. Sp. Pl. 1082 (1753); Griseb. Fl. Br. W.I.I. 686 (1864).

A species with circum-Caribbean Distribution; in Dominica found in moist forests at middle elevations—Lisdara (2399), Massacre River Falls (1353), Ridgefield (2200).

24. HEMIDICTYUM Presl

1. HEMIDICTYUM MARGINATUM (L.) Presl

Tent. Pter. iii. pl. 3, f. 24 (1836); Br. & Wils. Bot. P.R. vi. 444 (1926). *Asplenium marginatum* L. Sp. Pl. 1082 (1753); Griseb. Fl. Br. W.I.I. 680 (1864).

A large terrestrial fern occurring widely in tropical America; in Dominica found infrequently in moist wooded ravines along stream banks at middle elevations—Sylvania (84).

*Species in parentheses occur in the French Antilles and hence may be expected in Dominica.

25. ASPLENIUM L.

*Key to Species**

- a. Blades simple.....1. *A. serratum*
- a. Blades 1-3-pinnate.
 - b. Blades 1-4 cm. broad.
 - c. Blades of a linear type.
 - d. Fronds often difform, the sterile ones then short and prostrate; rachis green.....(*A. dentatum* L.)
 - d. Fronds alike, ascending; rachis atropurpureous.....2. *A. formosum*
 - c. Blades of a deltoid type.....3. *A. pumilum*
 - b. Blades 4-40 cm. broad.
 - e. Pinnae entire to pinnatifid.
 - f. Blades whitish-septate-hirtellous beneath.....3. *A. pumilum*
 - f. Blades not hirtellous.
 - g. Rhizome creeping.
 - h. Pinnae coriaceous, lustrous, the ribs fibrillose-chaffy.....4. *A. serra*
 - h. Pinnae thin, dull, the ribs not chaffy.
 - i. Stipe and rachis brown; pinnae glandular beneath.....5. *A. laetum*
 - i. Stipe and rachis olivaceous; pinnae glabrous.....6. *A. obtusifolium*
 - g. Rhizome erect to decumbent.
 - j. Fronds rooting at the whiplike tip.....(*A. radicans* L.)
 - j. Fronds not rooting at tip.
 - k. Blades linear, the rachis obviously greenish-alate.....7. *A. pseudoerectum*
 - k. Blades linear-oblong to deltoid-oblong; rachis obscurely alate, if at all.
 - l. Blades ovate-oblong or deltoid-oblong; indusia membranous, brownish.....8. *A. abscissum*
 - l. Blades narrowly to broadly oblong; indusia coriaceous, whitish.
 - m. Pinnae dentate to crenate-serrate.....9. *A. salicifolium*
 - m. Pinnae serrate to serrately incised or lobed.....10. *A. auritum*
 - e. Pinnae 1-2-pinnate.
 - n. Rachis widely green-alate ventrally; pinnate alternate, sessile or nearly so.....11. *A. cristatum*
 - n. Rachis not alate; pinnae subopposite, stalked.....12. *A. cuneatum*

1. ASPLENIUM SERRATUM L.

Sp. Pl. 1079 (1753); Griseb. Fl. Br. W.I.I. 680 (1864); Br. & Wils. Bot. P.R. vi. 445 (1926).

Widespread in tropical America usually along streams in wet forests at middle elevations. Domin records Eggers specimens (707, 1067) from Dominica but I have seen no material from the island.

2. ASPLENIUM FORMOSUM Willd.

Sp. Pl. v. 329 (1810); Griseb. Fl. Br. W.I.I. 683 (1864); Br. & Wils. Bot. P.R. vi. 446 (1926).

*Names in parentheses are species known from neighboring Guadeloupe and hence may be expected in Dominica.

Asplenium marinum L. of West Europe has been reported from both Dominica and St. Vincent in the Lesser Antilles. The St. Vincent collection has been examined by Domin who confirms it as typical though fragmentary. The Dominica record is based on Duss 1430 (not seen by the present writer) from montane forests at Laudat, a very strange site for a European coastal fern, and to be doubted.

Worldwide in dispersal, inhabiting wet mossy rocks at lower and middle elevations. Dominica material collected by Eggers (510, 799, 844) and Lloyd (534, collected at Soufrière) is cited by Domin but I have seen no material from the island.

3. *ASPLENIUM PUMILUM* Sw.

Prodr. 129 (1788); Griseb. Fl. Br. W.I.I. 683 (1864); Br. & Wils. Bot. P.R. vi. 447 (1926).

Common in the West Indies and the continental tropics of America; in Dominica terrestrial on shady banks at lower elevations—Morne Bruce (303), along trail between South Chiltern and Soufrière (1637).

4. *ASPLENIUM SERRA* Langsd. & Fisch.

Icon. Fil. xvi. pl. 19 (1810); Griseb. Fl. Br. W.I.I. 682 (1864); Br. & Wils. Bot. P.R. vi. 447 (1926). *A. serra* var. *imrayanum* Hook. Sp. Fil. iii. 155 (1866) in part. *A. imrayanum* Domin Pterid. Dominica 173 (1929).

A variable species of both tropical America and tropical Africa, occurring on tree trunks and rich humus in mountain forests at middle and higher elevations. Imray 21, the only record for Dominica, is the basis for the names published by Hooker and Domin that are here treated as synonyms.

5. *ASPLENIUM LAETUM* Sw.

Syn. Fil. 79, 271; (1806); Griseb. Fl. Br. W.I.I. 681 (1864); Br. & Wils. Bot. P.R. vi. 447 (1926).

A widespread tropical American fern; found in Dominica in dense shade on wet soil on banks or in ravines—Morne Diablotin (2794).

6. *ASPLENIUM OBTUSIFOLIUM* L.

Sp. Pl. 1080 (1753); Griseb. Fl. Br. W.I.I. 681 (1864); Br. & Wils. Bot. P.R. vi. 448 (1926).

A widespread species in the American tropics; in Dominica common on wet soil or wet rocks in shaded sites mostly near streams at middle elevations—Lisdara (2410), Morne Diablotin (2793), Sylvania (1092); also reported by Domin from the "lakes" near Laudat, from Homewood, and from Rosalie.

7. *ASPLENIUM PSEUDOERECTUM* Hieron.

In Hedwigia lx. 239 (1918); Br. & Wils. Bot. P.R. vi. 449 (1926).

A West Indian species; in Dominica epiphytic or lithophytic in moist forests at middle elevations—Fon Pays (2859), Morne Anglais (306), Morne Diablotin (2776).

8. *ASPLENIUM ABSCISSUM* Willd.

Sp. Pl. v. 321 (1810); Br. & Wils. Bot. P.R. vi. 449 (1926).

A terrestrial fern of moist ravines at lower and middle elevations throughout tropical America. I have seen no Dominica material though this island is listed by Maxon in the Porto Rico flora.

9. *ASPLENIUM SALICIFOLIUM* L.

Sp. Pl. 1080 (1753); Br. & Wils. Bot. P.R. vi. 450 (1926). *A. cultrifolium* L. var. *auriculatum* Sw., Griseb. Fl. Br. W.I.I. 680 (1864).

A common epiphytic fern of tropical America; in Dominica found in humid forests at middle elevations—La Chaudière (3511), Laudat (1745), Lisdara (304, 2373), Massacre Falls (1337), Milton (2603), Pegoua River Valley (2970, 3456), Roseau Valley Falls (2017).

10. *ASPLENIUM AURITUM* Sw.

In Journ. Bot. Schrad. 52 (1801); Griseb. Fl. Br. W.I.I. 682 (1864); Br. & Wils. Bot. P.R. vi. 450 (1926).

A common, pantropical, and exceedingly variable fern; in Dominica found in moist forests at middle elevations—Morne Diablotin (base) (2774), Lisdara (302), Massacre Falls (1015), Mt. Joy (1297).

Certain Lesser Antillean forms of this species have rigid pinnae which are deeply pinnatifid or subpinnate, and so resemble very closely *A. fragrans* Sw., a species known from both Guadeloupe and Martinique and hence to be expected in Dominica. Domin has examined the Imray specimen (55) which is the basis for Grisebach's record of *A. fragrans* for Dominica and finds that the specimen is referable to *A. auritum*.

11. *ASPLENIUM CRISTATUM* Lam.

Encycl. ii. 310 (1786); Br. & Wils. Bot. P.R. vi. 452 (1926).

An epiphytic fern found throughout tropical America; in Dominica inhabiting moist forests at middle elevations—Morne Colla Anglais (305), South Chiltern (1562, 1639).

Asplenium myriophyllum (Sw.) Presl, a species somewhat similar to the present one, is recorded by Grisebach from Dominica but Domin has pointed out that Grisebach united more than one species under this binomial. In the Porto Rico flora Maxon further indicates that this is a limestone inhabiting fern of the Greater Antilles and of South America. I know of no limestone areas in Dominica.

12. *ASPLENIUM CUNEATUM* Lam.

Encycl. 309 (1786); Griseb. Fl. Br. W.I.I. 684 (1864); Br. & Wils. Bot. P.R. vi. 453 (1926).

Principally West Indian where it is epiphytic on tree trunks and stumps in moist forests at middle elevations. I have seen no material from Dominica but Domin reports it "in rich humus and on rotten logs in humid mountain forests near Homewood."

26. *BLECHNUM* L.*

Key to Species

- a. Fronds strongly dimorphic, (the fertile blades non-foliose; sori intramarginal.
- b. Epiphytic; rhizomes high climbing.
 - c. Rhizome scales with blackish medium line.....1. *B. polypodioides*
 - c. Rhizome scales lacking blackish medium line.....2. *B. plumieri*
- b. Terrestrial; rhizomes ascending to rigidly erect.
 - d. Sterile blades pinnatisect or nearly so, the segments fully adnate.
 - e. Stipes (of the sterile fronds, at least) without scarlike vestigial pinnae; lamina lanceolate, 5-11 cm. wide; pinnae mainly falcate.....3. *B. l'herminieri*
 - e. Stipes with vestigial pinnae; lamina elliptical, ovate-lanceolate, oblong-deltoid, or deltoid, 12-32 cm. wide; pinnae mainly straight, diverging.....4. *B. divergens*

*Including *Salpichlaena* J. Sm. and *Struthiopteris* Scop.

- d. Sterile blades fully pinnate, the pinnae mostly sessile or subsessile.
 - f. Rhizome scales very slender, rigidly erect, with dark centers; vestigial pinnae present; margins entire; coriaceous. (*B. rufa* (Spreng.))*
 - f. Rhizome scales broad, flaccid, without dark centers; vestigial pinnae lacking; margins more or less serrate.
 - g. Stipes red-purple to black; pinnae with an acute apex; lower fertile pinnae usually with spurlike protuberances. 5. *B. violaceum*
 - g. Stipes straw-colored to chestnut; pinnae with an acuminate apex; lower fertile pinnae usually without spurlike protuberances. 6. *B. striatum*
- a. Fronds nearly uniform (somewhat reduced in no. 7); sori borne against the costa of foliose pinnae.
 - h. Scandent. 7. *B. volubile*
 - h. Terrestrial.
 - i. Blades fully pinnate throughout, the pinnae conform, sessile; margins strongly spinulose-serrulate. 8. *B. indicum*
 - i. Blades pinnate below, the upper segments adnate and confluent below the evenly attenuate apex; margins minutely serrulate.
 - j. Blades ovate to oblong-lanceolate; pinnae mostly rounded or cordate at base, the lower ones free, not greatly reduced. 9. *B. occidentale*
 - j. Blades linear, attenuate both ways; pinnae mostly dilatate-adnate, the basal ones greatly reduced. (*B. unilaterale* Sw.)**

1. BLECHNUM POLYPODIOIDES (Sw.) Kuhn

Fil. Afr. 92 (1868). *Osmunda polypodioides* Sw. Prodr. 127 (1788). *Iomaria attenuata* Willd., Griseb. Fl. Br. W.I.I. 673 (1864). *Struthiopteris polypodioides* (Sw.) Trev., Br. & Wils. Bot. P.R. 454 (1926).

A common epiphyte of the Caribbean area; in Dominica creeping in mats of moss on trees in wet mossy forests at higher elevations—Morne Plat Pays (1657), Morne Trois Pitons (1435).

2. BLECHNUM PLUMIERI (Desv.) Mett.

Fil. Lips. 61 t. 4, f. 19-20 (1856). *Lomaria plumieri* Desv. in Berl. Mag. v. 325 (1811).

A climbing epiphyte of the volcanic Caribbees; in Dominica growing up to 6 meters chiefly on trees at middle and higher elevations—Laudat (1975), Morne Anglais (88, 92), Morne Trois Pitons (89).

3. BLECHNUM L'HERMINIERI (Bory) Mett.

Fil. Lips. 64 t. 4, f. 14-15 (1856). *Lomaria l'herminieri* Bory in Kze. Farnkr. i. 173 t. 73 (1845).

A Lesser Antillean species ranging from Guadeloupe to Grenada; in Dominica terrestrial in wet soil in the mossy forests of higher elevations—Morne Anglais (90). Probably to be found on all the higher peaks, for Domin also cites a collection, Lloyd 885, from Morne Diablotin.

4. BLECHNUM DIVERGENS (Kze.) Mett.

Ex Hook. Sp. Fil. iii. 8 (1860). *Lomaria divergens* Kze., Griseb. Fl. Br. W.I.I. 673 (1864). *Struthiopteris exaltata* (Fée) Broadh., Br. & Wils. Bot. P.R. 454 (1926).

A common terrestrial fern of the West Indies; in Dominica on wet soils in mossy forests at highest elevations—Morne Anglais (2276), Morne Diablotin (2804), Morne Trois Pitons (91).

*Occurs in neighboring Guadeloupe and so possibly to be expected in Dominica.

**Occurs in neighboring Martinique and so possibly to be expected in Dominica.

5. BLECHNUM VIOLACEUM (Fée) C. Chr.

Ind. Fil. 161 (1905). *Lomaria procera* of authors, Griseb. Fl. Br. W.I.I. 673 (1864) in part, as to Imray plant. *Lomaria violacea* Fée, Hist. Foug. et Lyc. Ant. 11 (1866).

An endemic fern of Guadeloupe, Dominica, and Martinique; terrestrial in wet montane forests, especially common in mossy forests at highest elevations—Boiling Lake (1915), Morne Anglais (2285), Morne Trois Pitons (87). Also reported from Homewood (Domin), Laudat (Lloyd 315), and “Couliabon Mts” (Imray 83).

6. BLECHNUM STRIATUM (Sw.) C. Chr.

Ind. Fil. 160 (1905). *Onoclea striata* Sw. Syn. Fil. 304, 422 (1806).

A common terrestrial fern of the highest elevations throughout the Caribbees; in Dominica inhabiting the mossy-forest belt—Castle Bruce Track (1231), Laudat (1856), Morne Anglais (85), Morne Plat Pays (1701), Morne Trois Pitons (86).

Broadhurst (“The Genus *Struthiopteris* and its representatives in North America”, in Bull. Torr. Bot. Club 39 (1912) page 376) has pointed out that this species has large and small forms but that field notes are too scanty to help explain these differences. The present writer notes that the two forms occur in Dominica and that the small forms are always found at higher elevations, and possibly accountable to the more exposed sites obtaining on the ridges. Among the specimens cited above only the Laudat and Castle Bruce Track specimens from sheltered forest sites are large forms and these are up to a meter high. Specimens examined by me from other isles in the Lesser Antilles indicate that small size is not simply a function of elevation for large forms are often found on or near the summits but is possibly due to the relative degree of exposure of the individual site.

7. BLECHNUM VOLUBILE Kaulf.

Enum. Fil. 159 (1824); Griseb. Fl. Br. W.I.I. 673 (1864). *Salpichlaena volubilis* (Kaulf.) J. Sm.

A scandent species of Jamaica, the Lesser Antilles, and continental South America. In Dominica seldom seen in a fertile condition but very common in humid forests at middle elevations where it climbs upwards of 10 meters on the tree trunks—Castle Bruce Trail (1208), La Chaudière (3571), Laudat (1986), Morne Anglais (97), Morne Nichols (1907), Morne Plat Pays (1712), Pegoua River Valley (3482), Sylvania (98).

8. BLECHNUM INDICUM Burm.

Fl. Ind. 231 (1768); Br. & Wils. Bot. P.R. 456 (1926). *B. serrulatum* L. C. Rich., Griseb. Fl. Br. W.I.I. 673 (1864).

A common pantropical terrestrial fern of open sites at lower elevations. Curiously I have not seen this species in Dominica yet an Eggers specimen (unnumbered) from Soufrière is in the Gray Herbarium, and other collections are cited by Domin (Eggers 13 and 709, Imray 77, Lloyd 13 from Soufrière, and an unnumbered Wakefield collection from the same locality).

9. *BLECHNUM OCCIDENTALE* L. (Fig. 48)

Sp. Pl. 1077 (1753) (as *B. orientale* L.); Griseb. Fl. Br. W.I.I. 673 (1864); Br. & Wils. Bot. P.R. 456 (1926).

A very common terrestrial fern of tropical America; in Dominica found on open sites at lower and middle elevations—Lisdara (93), Morne Bruce (94), Morne Brule (95), Pegoua River Valley (3447), Sylvania (96).

27. *STENOCHLAENA* J. Sm.1. *STENOCHLAENA SORBIFOLIA* (L.) J. Smith

In Journ. Bot. Hook. iv. 149 (1841); Griseb. Fl. Br. W.I.I. 674 (1864); Br. & Wils. Bot. P.R. vi. 458 (1926). *Acrostichum sorbifolium* L. Sp. Pl. 1069 (1753). *Stenochlaena longifolia* J. Smith *sensu* Grisebach, loc. cit.

A West Indian species ranging from Hispaniola to Grenada; in Dominica locally common at middle elevations on rocks and trees—Lisdara (2401), Sylvania (99). Domin also reports it from Homewood and the Macoucherie Ridge and Lloyd has collected it along the Imperial Road below Trois Pitons (743, 744).

Stenochlaena marginata (Schrad.) C. Chr., a species of the continental tropics of Central and South America, has been reported from Dominica by Krug (according to Domin) on the basis of a Ramage collection. The species is not otherwise known in the West Indies and the record is to be doubted.

28. *POLYBOTRYA* Humb. & Bonpl.1. *POLYBOTRYA CERVINA* (L.) Kaulf.

Enum. Fil. 55 (1824); Br. & Wils. Bot. P.R. vi. 458 (1926). *Osmunda cervina* L. Sp. Pl. 1065 (1753). *Olfersia cervina* Kunze, Griseb. Fl. Br. W.I.I. 678 (1864).

Of wide occurrence in tropical America; in Dominica a common fern usually terrestrial but sometimes on wet cliffs at middle elevations—La Chaudière (3563), Laudat (1785, 1976), Lisdara (100), Milton (2874), Morne Plat Pays (1715), Sylvania (101).

29. *BOLBITIS*1. *BOLBITIS NICOTIANAEOFOLIA* (Sw.) Alston

In Kew Bull. 1932/310 (1932). *Acrostichum nicotianaefolius* Sw. Syn. Fil. xiii. 199 (1806). *Leptochilus nicotianaefolius* (Sw.) C. Chr., Br. & Wils. Bot. P.R. vi. 459 (1926).

A West Indian and Central American scandent species found on tree trunks at lower to middle elevations—Pegoua River Valley (3130).

30. *CYCLOPELTIS* J. Sm.1. *CYCLOPELTIS SEMICORDATA* (Sw.) J. Smith

In Curtis's Bot. Mag. lxxii. 36 (1846); Br. & Wils. Bot. P.R. vi. 462 (1926). *Polypodium semicordatum* Sw. Prodr. 132 (1788). *Aspidium semicordatum* Sw., Griseb. Fl. Br. W.I.I. 689 (1864).

A coarse terrestrial fern of moist rocky woods general throughout tropical America usually at lower and middle elevations. The single Dominica record is based on an Eggers collection mentioned by Domin (ex Krug).

31. DRYOPTERIS Adans.

*Key to Species**

- a. Blades simply pinnate, the pinnae entire to deeply pinnatifid.
 - Lamina without true hairs (consisting of a single row of one or several cells).....1. *D. rotundata*
 - Lamina with true hairs.
- b. Veins free and distinct, all excurrent to the margin above the sinus.
 - c. Tertiary veins of 1-10 pairs.
 - d. Pinnae seldom more than 10 cm. long, 1.5 cm. broad.
 - Rhizomes wide creeping, forming colonies.....2. *D. clypeolulata*
 - Rhizomes erect or suberect, not wide-creeping.
 - Lamina very gradually narrowed towards the base; reduced pinnae numerous, stipe very short; basal segments especially the upper one, generally longer and often broader than the others.
 - Pinnae alternate, unequal-sided, the upper side broader than the lower.
 - Indusium minute or absent.....3. *D. sancta*
 - Indusium large, persistent.....4. *D. consanguinea*
 - Pinnae opposite, equal-sided.....5. *D. opposita*
 - Lamina shortly attenuate towards the base with 1-4 pairs of reduced pinnae; basal segments equal or shorter than the others, seldom a little longer.
 - Sporangia setose.....6. *D. concinna*
 - Sporangia glabrous.
 - Segments acute.....7. *D. hydrophila*
 - Segments rounded or somewhat truncate.....8. *D. mollicella*
 - d. Pinnae 10-15 cm. long, 2-5 cm. broad.
 - Stipe and rachis with conspicuous scales.....9. *D. rustica*
 - Stipe and rachis without apparent scales.....10. *D. germaniana*
 - c. Tertiary veins of 10-50 pairs.
 - Segments linear, 8-15 mm. long, acutish; aerophores wanting; veins of 10-18 pairs, distant; sori supramedial.
 - Tertiary veins of about 10 pairs.....11. *D. harcourtii*
 - Tertiary veins of from 13-18 pairs.....12. *D. sprengelii*
 - Segments liguliform, 12-22 mm. long, rounded at apex, subtended by linear, brown aerophores; veins of 25-50 pairs, very close; sori inframedial.....13. *D. decussata*
- b. Veins partially connivent to wholly areolate; or the basal ones, if free or barely connivent, meeting at the sinus or sinus membrane, or, if truly joined, the resulting veinlet excurrent to the sinus.
 - e. Sori round, separate; upper veins, at least, not areolate.
 - Rhizome naked.....14. *D. glandulosa*
 - Rhizome scaly.
 - f. Rhizome scales glabrous or furnished with simple hairs, the hairs of the blades also simple; indusia large, persistent.
 - g. Basal veins of adjacent lobes or segments truly joined, the resulting veinlet excurrent to the sinus.
 - Rhizome wide-creeping, nearly naked; pinnae stalked, crenate or lobed halfway, the lobes broadly deltoid....(*D. gongylodes*)
 - Rhizome erect or decumbent, paleaceous; pinnae sessile, pinnatifid three-fourths the distance to the costa, the segments oblong.....15. *D. dentata*
 - g. Basal veins running to the sinus membrane, not truly joined.
 - Leaf-tissue papyraceous or thin-herbaceous; distal basal segments usually much enlarged.
 - Rhizome erect, stout, the fronds fasciculate; scales ovate, glabrous.....16. *D. patens*
 - Rhizome creeping, slender, the fronds distichous; scales linear, ciliate, hairy.....17. *D. normalis*
 - Leaf-tissue coriaceous; basal lobes or segments usually shorter, often greatly reduced.....18. *D. oligophylla*

*Species in parentheses occur in the adjoining French islands and so are to be expected in Dominica.

- f. Rhizome scales furnished with short-stalked stellate (rarely furcate) hairs, similar hairs borne also upon the rachis and commonly on the minor vascular parts and leaf-tissue; indusia minute, vestigial, or wanting.
- h. Blades terminating abruptly in a large conform pinna.
Rhizome scales with forked hairs; pinnae 2-6 pairs, subentire to serrate-crenate, pilosulous; lower 2-4 veins meniscoid.
.....19. *D. poiteana*
- Rhizome scales stellate-pubescent; pinnae 6-12 pairs, lobed or pinnatifid, not pilosulose; only the basal veins united.
Pinnae 6-13 cm. long; veins 6-10 pairs; leaf-tissue pellucid, usually glabrous; sori inframedial, the sporangia setose.
.....20. *D. subtetragona*
- Pinnae 15-28 cm. long; veins 10-16 pairs; leaf-tissue brownish, minutely stellate-puberulous; sori medial, the sporangia glabrous.....21. *D. megalodus*
- h. Blades lacking a large conform terminal pinna.
Pinnae 1.5-5 cm. long.....(*D. reptans*)
Pinnae more than 5 cm. long.....22. *D. guadalupensis*
- e. Sori linear-oblong, mostly confluent; all veins joined in regular meniscoid areoles.
Pinnae distant, mostly stalked, sharply serrate, the apical teeth often hamate.....(*D. serrata*)
Pinnae closer, mostly sessile, the margins entire to lightly crenate.
.....23. *D. reticulata*
- a. Blades 2-4 pinnate.
Rhizomes creeping.....(*D. effusa*)
Rhizomes erect.
Costules above bearing long subulate hairs.
Sori exindusiate; rachises and midribs of pinnae and pinnules straw-colored, sparsely paleaceous.....24. *D. subincisa*
- Sori indusiate, large, coriaceous, persistent; rachises and midribs of pinnae and pinnules densely villose-hairy.....25. *D. villosa*
- Costules above lacking long subulate hairs.....26. *D. excelsa*

1. DRYOPTERIS ROTUNDATA (Willd.) C. Chr.

Ind. Fil. 289 (1905). *Aspidium rotundatum* Willd. Sp. Pl. v. 247 (1810). *Polypodium flavopunctatum* Kaulf., Griseb. Fl. Br. W.I.I. 697 (1864). *Dryopteris imrayana* (Hook.) Domin. *Nephrodium imrayanum* Hook. Sp. Fil. iv. 86 (1862).

Found in the Lesser Antilles and in southern Brazil; in Dominica inhabiting shaded ravines or moist forested slopes at middle elevations—Laudat (1972), Lisdara (104, 2377), Sylvania (103). Certain of the Dominica material such as *Hodge* 104 and *Imray* 8 represent what Domin calls *Dryopteris imrayana*; it differs from normal material in "the much shorter, serrate (and not lobed) pinnae, tapering more distinctly towards the acuminate apex..." (Domin).

2. DRYOPTERIS CLYPEOLUTATA (Desv.) Weatherby (Fig. 49)

In Contrib. Gray Herb. cxiv. 28 (1936). *Nephrodium clypeolulatum* Desv. Mém. Soc. Linn. Paris vi. 258 (1827). *Dryopteris l'herminieri* (Kze.) C. Chr.

A common Lesser Antillean species; in Dominica colonial at moist middle elevations—Castle Bruce Trail (1222), La Chaudière (3564), Lisdara (124, 2457), Morne Anglais (125), Morne Plat Pays (1658), Pegoua River Valley (3423), Sylvania (126, 1106, 1243, 2617). The species has also been collected near Laudat, the Freshwater and Boeri Lakes, and at Homewood (*vide* Domin).

3. DRYOPTERIS SANCTA (L.) Kuntze

Rev. Gen. Pl. ii. 813 (1891); Br. & Wils. Bot. P.R. vi. 467 (1926). *Acrostichum sanctum* L. Syst. Nat. ed. 10, ii. 1320 (1759). *Aspidium sanctum* Mett., Griseb. Fl. Br. W.I.I. 691 (1864).

Primarily a West Indian species (also in Guatemala); in Dominica found on mossy, shaded rocks and cliffs along streams at middle elevations—La Chaudière (3568), Milton (2881); also reported from Laudat (Eggers 734), Layou Forest (Ramage), Macoucherie Ridge (Domin), Roseau Valley Falls (Wakefield) and Sylvania (Cooper 104).

4. *DRYOPTERIS CONSANGUINEA* (Fée) C. Chr.

In Vid. Selsk. Skr. ser. vii. 297 (1907). *Aspidium consanguineum* Fée Hist. Foug. et Lyc. Ant. 76 (1866).

Ranges from Guadeloupe to Trinidad and also recorded from Panama. In Dominica this species is usually found on rocks in or near streams, especially at middle elevations—Castle Bruce Trail (1218), La Chaudière (3528), Laudat (1816), Lisdara (127), Massacre Falls near Sylvania (1363), Pegoua River Valley (3474), Roseau Valley Falls (2027), Sylvania (1107); also reported by Domin from Rosehill (Eggers 733) and the Macoucherie Ridge. A hybrid between this species and *D. sancta* also has been described by Domin for Dominica.

5. *DRYOPTERIS OPPOSITA* (Vahl) Urban

Symb. Ant. iv. 14 (1903); Br. & Wils. Bot. P.R. vi. 466 (1926). *Polypodium oppositum* Vahl Eclog. Amer. iii. 53 (1807). *Aspidium conterminum* Willd., Griseb. Fl. Br. W.I.I. 691 (1864).

A species of Puerto Rico, the Lesser Antilles, and northern South America; in Dominica forming tufts on steep wet cleared slopes chiefly at middle elevations—Laudat (1760), Lisdara (113), Morne Anglais (128), Pegoua River Valley (3452), Sylvania (129, 1159, 1333).

6. *DRYOPTERIS CONCINNA* (Willd.) O. Ktze.

Rev. Gen. ii. 812 (1891). *Polypodium concinnum* Willd. Sp. Pl. v. 201 (1810). A species ranging primarily from Mexico to Ecuador but with scattered distribution in the West Indies. Domin cites a single collection (Imray 108) from Dominica.

7. *DRYOPTERIS HYDROPHILA* (Fée) C. Chr.

Ind. Fil. 271 (1905). *Phegopteris hydrophila* Fée Hist. Foug. et Lyc. Ant. 56 (1866).

A species limited primarily to Guadeloupe, Dominica, and Martinique; in Dominica occurring at higher elevations between Laudat and the Freshwater Lake (1857).

Dryopteris oligocarpa (H. & B.) O. Ktze., a related species, has been reported from Dominica by Grisebach under the name *Aspidium oligocarpum* but Domin has pointed out (page 197) that the specimen (Imray 64) on which this record is based is not referable to this species but to an undetermined species.